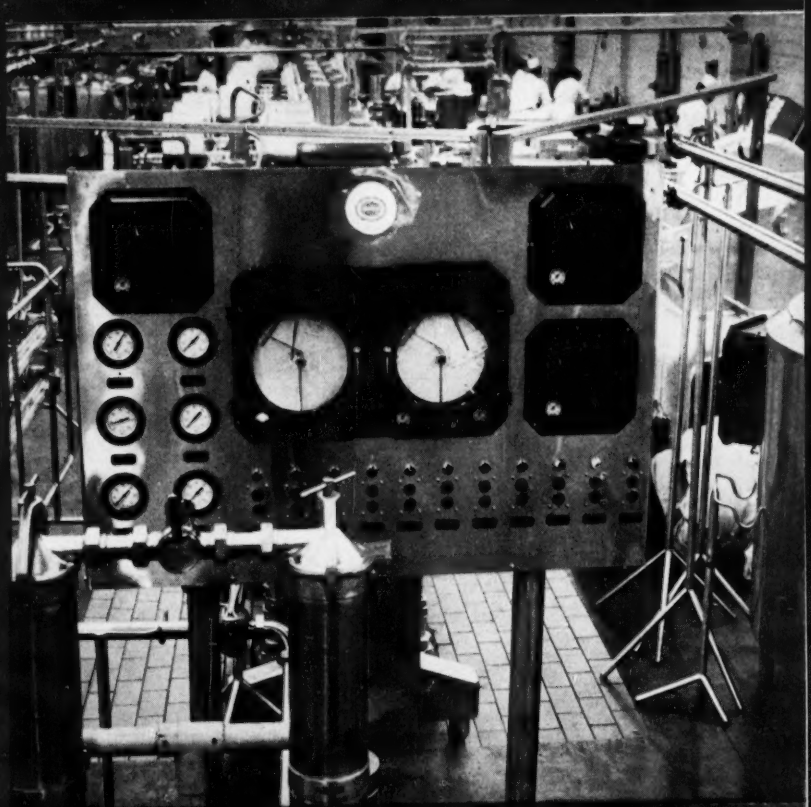
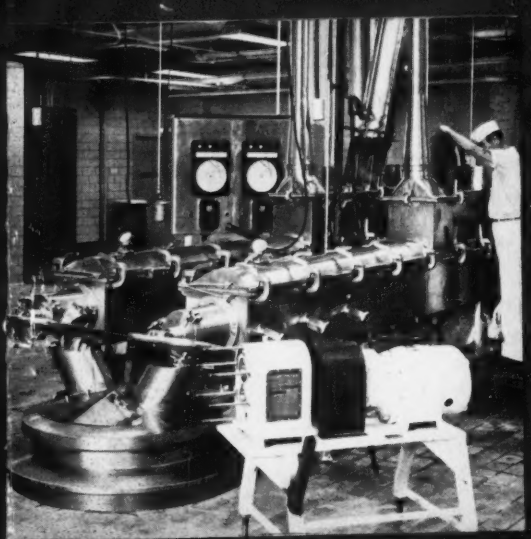
DAIRY SPECIAL
with SHOW GUIDE

FOOD ENGINEERING

A McGRAW-HILL PUBLICATION





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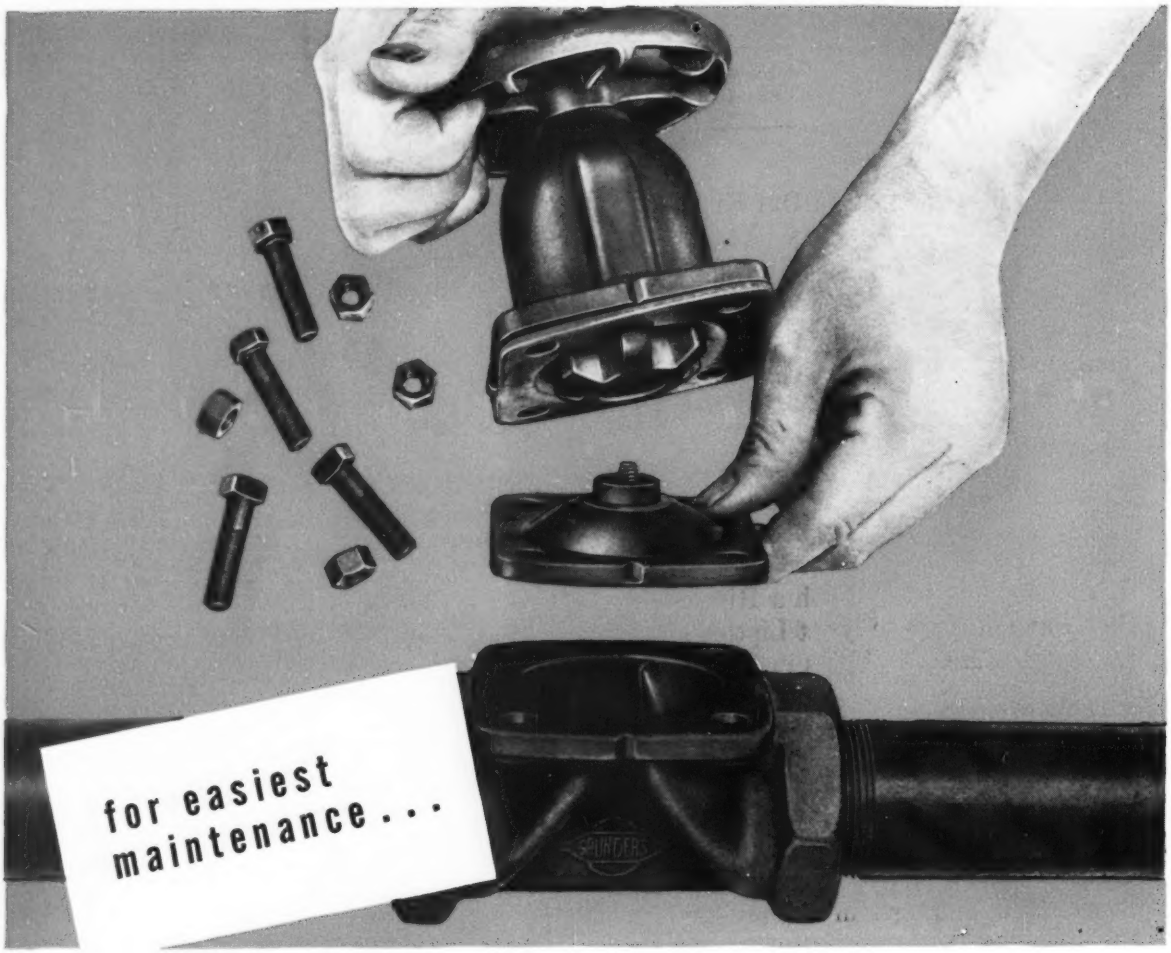

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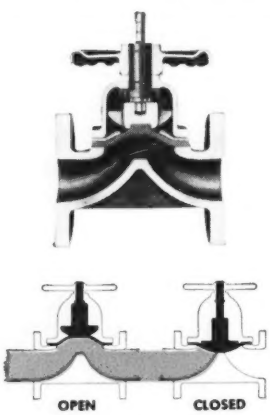

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October 1954

Volume 26 Number 10

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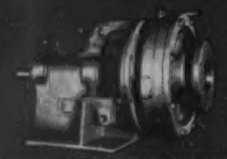 Frame Mounted: 5286351, 5286105 Close-coupled: 5286083, 5286140	**S5B** Single suction Frame mounted Grease lubricated Also available close-coupled	General purpose use	Heads to 550 feet. Capacities to 3500 gpm. Temperatures to 250 F.	Available in many materials. Choice of packing, single or double mechanical seal. Bearings protected from corrosive or abrasive atmosphere.
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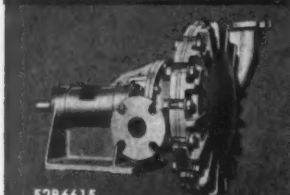 5286615	**P and PD** Single suction Frame mounted Grease lubricated	Handling fine abrasives in suspension or corrosive liquids	Heads to 260 feet. Capacities to 1300 gpm. Temperatures to 250 F.	Stuffing box on suction side. Choose packing, mechanical seal or *Equiseal* stuffing box — stops leakage to 15 feet suction head. Open or closed impeller.
5287112 (PW) 5286381 (CW)	**PW — CW** Single suction Frame mounted Grease lubricated	Handling slurries and pulps which combine corrosive liquid with suspended solids	Heads to 270 feet. Capacities to 10,000 gpm. Temperatures to 250 F.	Available in many materials. Choice of packing or mechanical seal. Easy to disassemble for inspection or repair.

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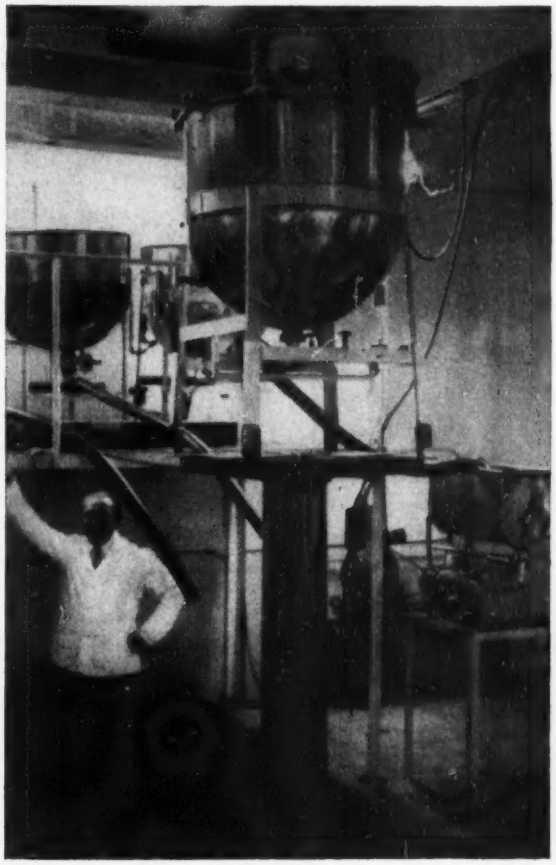
PRACTICAL IDEAS



Lift Protects Product Quality

In the manufacture of high quality preserves, it is very essential to minimize the breaking up of the fruit.

As is well known, the usual practice is to take out the finished preserves from the cooking kettles by means of a pump. But due to the pumping action, a considerable amount of the fruit is broken up by the time it passes through the cooling tank into the filling machine.

In our new one-floor plant, I devised a simple way to overcome the difficulty. I had the cooling tank placed on a lift.

As shown in the picture at the left, the cooking kettles are mounted on a platform alongside the cooling tank. After the preserves are cooked, they are transferred by gravity into the cooling tank, by means of sanitary neoprene tubes. Then the cooling tank is lifted high enough so that the preserves are passed, again by gravity, directly into the filling machine, as may be seen in photo at right.

Cost of lift and air compressor, which were bought second hand, was less than that of the lowest-priced sanitary pump on the market.—*Marcel G. Eye, Food Technologist, The David Crystal Co., Los Angeles.*

Renovates Tank With Plastic Liner

In the manufacture of gelatin and recovery of byproducts at Atlantic Gelatin Division, we encounter many corrosive conditions. To prevent contamination of product and reduce corrosion, we use large quantities of such superior construction materials as stainless steel, aluminum, and glass.

Recently, we have been making increasing use of forms of plastics in process equipment and piping, since plastics are less expensive and often more resistant to chemical attack, especially at low temperature.

One of our first uses of polyester glass fiber was as a lining for a 1,500-gal. steel hot water storage tank in the ion-exchange installation. The internal surface was rusty

FOOD ENGINEERING
(Formerly Food Industries)
October 1954 Vol. 26, No. 10
Member ABC and ABP

Published Monthly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Donald C. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Executive Vice-President, Publication Div.; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.

Subscriptions: Address correspondence to Food Engineering—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.

Single copies 35¢. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries and the Philippines, $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y., under Act of Mar. 3, 1879.
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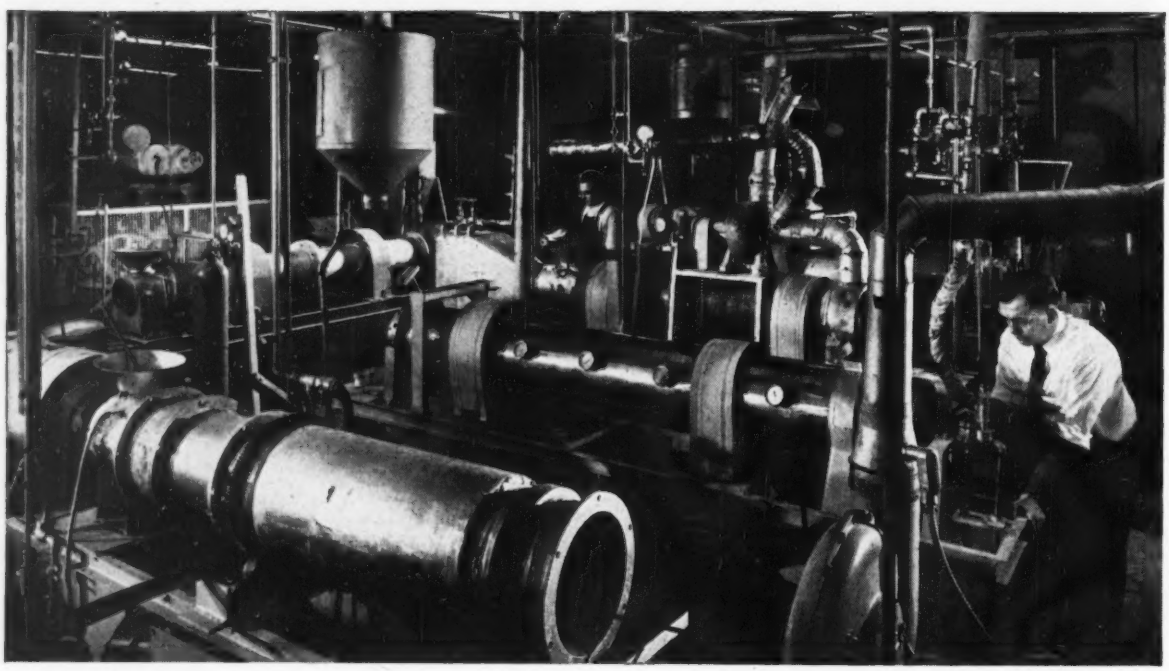
Advance testing in our pilot plant is just one of the steps we take to make sure every Louisville customer gets more than satisfactory results. From initial surveys by drying engineers to follow-up checks after installation, Louisville insures maximum performance from your dryers. Why not take advantage of these facilities? A Louisville engineer will be glad to look over your drying operation. There's no obligation . . . and the savings that may result are all yours.



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and uneven because of many years' service in grease storage and alterations by welding.

It is an axiom in the protective-coating business that the adherence of the coating is no better than the surface cleaning job. In this case, the inside surface was prepared by soaking and thorough washing with strong soap and hot water to remove grease. This was followed by a brisk brushing with steel wool to remove loose rust. Tight clinging rust was left on to provide a better grasping surface for the resin.

The first step in lining the tank was application of a liberal coat of resin to the dry, clean interior. While this was still tacky, one layer of glass-fiber cloth, cut to shape, was applied and smoothed on firmly. Another coat of resin was put on immediately to saturate the cloth and bond it firmly to the undercoat. After several hours, when this had hardened, a last seal coat of resin was applied for smoother finish and improved protection.

The resin formula used in this application was polyester and styrene into which 1½% paste catalst and 1½% accelerator were stirred in thoroughly before use. Since this formula remained fluid enough for hand brushing for one hour after mixing, only enough formula was mixed for each batch as would be applied in this time. Usual batch was 2 qt. The 3-in. paint brush was cleaned after each use in methyl ethyl ketone to remove liquid resin which, if allowed to stay on the brush, would soon harden and ruin the brush.

The glass fiber cloth was plain woven Type 1000, 42 in. wide. Strips cut to fit the round tank bottom had 2-in. overlap and extended up the straight sides 6 in. Sides were covered with vertical strips that extended from the bottom of the tank up and over the top flange.

Inside of the bottom outlet pipe and the face of the bottom flanges were similarly covered with resin and glass cloth. Side connections for thermometer and gage glasses were made with stainless steel pipes that extended into the tank, where they were sealed to the lining.

While the lining was being applied, the tank was laid on its side and rolled along to suit the convenience of the plant pipe coverer who did the work. He used a piece of light gage shim stock, 3x6 in. with rounded corners to smooth out the glass cloth while sticking it to the tacky resin surface. As he was applying the resin, a portable fan was used to direct fresh air into the tank to remove styrene vapors, which have a typical gassy odor.

This tank has been in continuous service for nine months and its lining is in good condition.

Similarly, the interior of a steel salt truck, which had been considerably thinned and weakened by corrosion, was cleaned and covered with polyester and glass fiber. This strengthened the truck, giving it a smooth corrosion-resisting surface along which the salt flows readily.—*Bror J. Grondal, Engineering Dept., Atlantic Gelatin Div., General Foods Corp., (from GF Technical Bulletin, June 1954).*

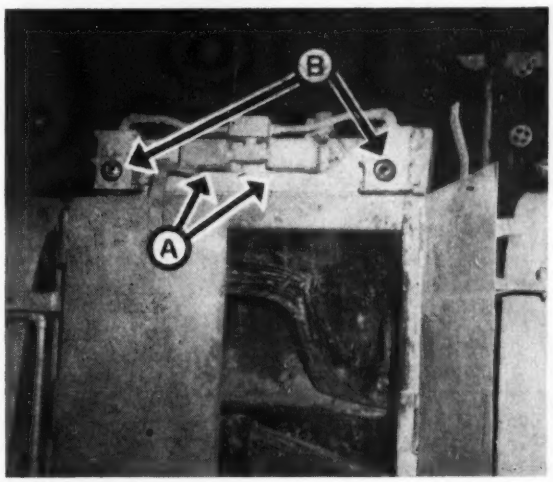
Keeps Dust Out of Drink

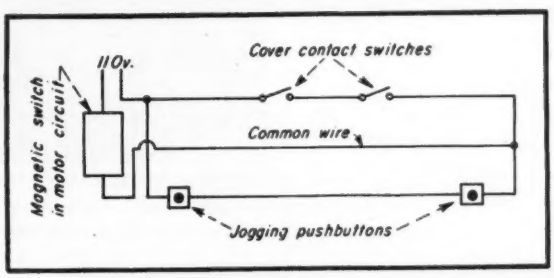
Cork dust can get into bottled products in the capping operation. The mechanical handling of the cork-lined caps in the machine which feeds them to the capper may dislodge small cork particles which find their way into the container.

This problem has been licked in the modern Coca-Cola bottling plant in Cincinnati. And the solution is quite simple. Small vacuum units, similar to the portable hand vacuum cleaners used in the home, have been mounted on the capping machines. These are bolted to the frame, and the suction nozzle is connected to a tube leading from the channel through which the caps pass on their way to the capping machine.

The units are connected into the electrical machine circuit so that they are in operation all the time that the bottling line is running.

The cork dust is collected in the cloth bag on the vacuum unit, and this bag needs to be emptied only at infrequent intervals because the amount of cork dust picked up is quite small—*FE Staff.*





Three-Way Mixer Safety

If exposed while in motion, the heavy blades of a 30 hp. chewing gum mixer are a most serious accident hazard. Yet there are times in the cycle of mixer operation when the blades must rotate while the mixer covers are open and the blades exposed.

To safeguard the operator under all circumstances, Topps Chewing Gum Co., Brooklyn, has developed three safety devices for its 50 gal. units.

First is a pair of electric cover-contact switches connected into the circuit of the magnetic controller for the mixer motor. These are conventional 15-amp. limit switches, mounted on the mixer under arms attached to each half of the split, hinged cover—(A) in photo.

With the lids closed, the switches make contact and permit electricity to flow to the magnetic control, so that the motor will operate (see simplified circuit diagram). But when the operator opens the lids, the switches break contact, the magnetic motor control opens, and the mixer stops.

To unload and clean the mixer, the operator must be able to rotate the mixer blades. And here's where the second safety device comes into play. Two pushbuttons (B) are connected into the motor control circuit, in parallel with the cover-contact switches, but in series with each other.

By pushing both buttons simultaneously, the operator can "jog" the mixer blades. Still he can't get caught in the mixer because "jogging" requires both of his hands

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2. Cut handling costs and manpower
3. Provide smooth, uniform handling
4. Eliminate can and product damage

These are a few of the many ways you save with FMC Can Handling Equipment—savings that help build bigger profits for you! And once you've installed this equipment, you're in for the added benefits of low operating and maintenance costs through years of continuous service.

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- **FMC AIR BLAST CAN DRYER** literally blasts cans dry at speeds up to 450 cpm, depending on can size. Permits immediate labeling and casing.
- **FMC KYLER CASER,** motor driven and hand operated models, combine simplicity and ruggedness, are efficiently adaptable to small capacity operations.
- **FMC KYLER LABELERS** apply spot or wrap-around labels on any type of round container with high speed and accuracy. Adjustable and non-adjustable models.
- **FMC CAN UNSCRAMBLER** speeds up delivery of filled cans from retort crate or shipping case to labeler or caser.
- **FMC UNIVERSAL CAN WASHER** quickly and thoroughly removes all dirt, dust and grime accumulated in empty cans through storage and handling.

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to be on the pushbuttons, which are located at opposite sides of the mixer.

The third safety gadget comes into play for loading the mixer, which requires initial mixing of ingredients while the lids are open. For this operation, a metal grate is placed over the mixer. Pressure of this grate closes the cover-contact switches, and the blades turn. But as soon as the safety grate is lifted, the switches open, stopping the mixer action.

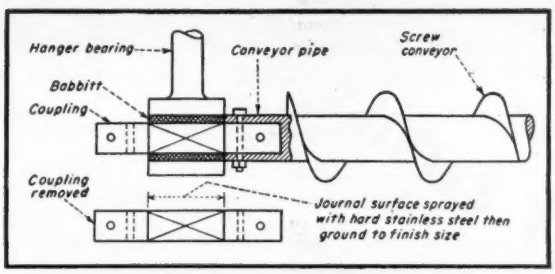
Colorless Candy Selects Taste Panel

In our plant a taste panel was easily formed by letting a large number of people taste several pieces of candy. We gave each of them eight pieces that were colorless, so that color would have no affect in the naming of flavors.

Of these eight pieces, there were two pairs of like flavors and four different flavors. And the tasters were asked to name the four different flavors and to pick the two pairs of flavors.

The tasters with the most correct answers were named to the taste panel. And in choosing the panel members, we took people from the office and from the production, maintenance, and sales departments. We felt that this distribution would give us a better panel than if all the tasters came from one department.

This taste panel has helped us very much. And now we feel that our flavors will be accepted by almost everyone, everywhere.—*W. H. Corwin, Brock Candy Co., Chattanooga, Tenn. (From talk at Midwestern Quality Control Meeting sponsored by Sears, Roebuck & Co.)*



Cuts Screw-Conveyor Maintenance

We have greatly reduced maintenance on screw conveyors handling wet, slightly acid, and abrasive material (wet cereal grains).

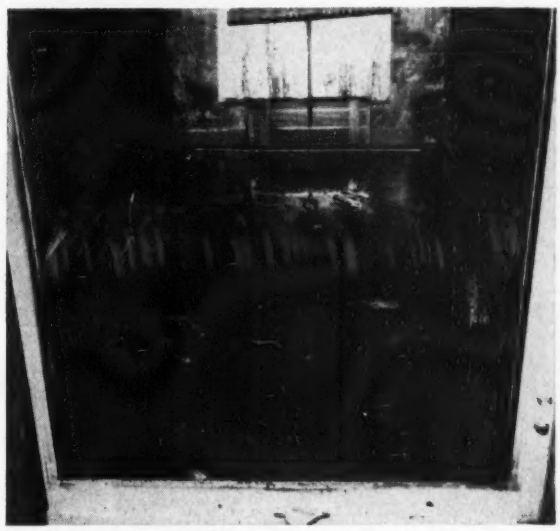
These conveyors formerly were equipped with babbitted hanger bearings and mild-steel couplings. But corrosive, abrasive action rapidly destroyed these couplings and bearings. Then couplings were changed to standard 304 stainless shafting with but slight improvement. Also, impregnated wood bearings were tried with little success.

The trouble seemed to be that a combination of abrasion and corrosion was roughing up the bearing surface of the mild-steel coupling, with consequent gouging of the babbitt. So it was decided to experiment with standard 304 stainless shafting, with the bearing surface (or journal) sprayed with hard stainless steel (500 Br.) and ground to size.

This experiment was successful. All couplings of screw conveyors handling the acid, abrasive material have been so revised. And all are in good condition after two years' service, as against a life of approximately nine months for the original design.

In addition to longer service, the old problem of coupling breakage during production operations has been eliminated.

The coupling bearing surface not only is smooth, but is abrasion and corrosion resistant. Therefore it produces no appreciable wear on the babbitted bearings.—*M. J. Hurd, Plant Engineer, Schenley Distillers, Inc., Frankfort, Ky.*



Smokes With Electricity

Because he was spending far too much time smoking meat in his locker plant, Alvin Young, Hartville, Ohio, decided to install an electrically heated and controlled smokehouse.

So such a unit was designed for him by Ohio Edison Co. Completely insulated, the smokehouse is 5 ft. wide by 9 ft. deep and 8 ft. high on the inside.

Double doors on the front permit easy access for the large racks of meat rolled in and out on a monorail system that adds further savings of time and work.

Heat is supplied by five electric heaters of 3-kw. capacity each. Two are located at the base of either sidewall, and one is at the floor level in the rear. The 360-cu. ft. unit, holding a ton of meat, is preheated in 30 min. Smoke, too, is supplied electrically from a smoke generator outside the smokehouse. Sawdust is sifted onto an electric heating unit, and the smoke is circulated and recirculated through the smokehouse by blowers.

With both time and temperature automatically controlled, the operator can load the smokehouse, set the controls—and forget it. Another advantage is that of uniform quality in the product. There is even distribution of heat, and the entire batch is done at the same time. There also is good control over shrinkage.

A test meter and record of operations shows that a ton of meat can be smoked with less than 200 kw-hr. of electricity.

Roller Paints Fence Fast

Borrow a trick from do-it-yourself home painters if you want to ease the task of painting wire fences around the factory premises. And you can save paint, too. The trick is to apply the paint with a roller, instead of a brush or spray.

For this purpose, a long-nap lambs-wool roller works best, according to Rust-Oleum Corp., Evanston, Ill., which has studied rollers for wire-fence painting. (Turn page)

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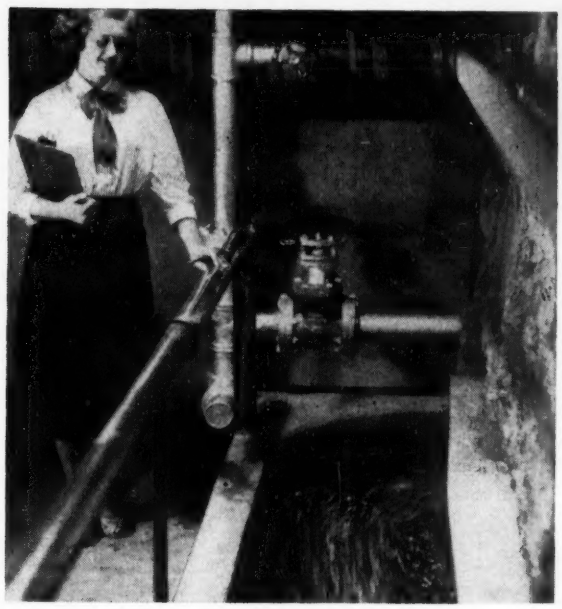
This roller is saturated by dipping into the paint, the excess then being removed by moving the roller over a flat board. To prevent paint from being wasted at this point, the board can be placed on end in a large paint can, and leaned, of course, against the top edge of the can to provide an inclined surface. With the paint supply in the bottom of the can, this makes a handy arrangement.

The technique is said to cut the time for painting wire fences about in half as compared with use of brush or spray. And practically all the paint goes onto the fence, not on the ground.



Sluiceway Handles Berries

As the girl in the picture watches, the "river of cranberries" is saving material-handling money for her employers.

Ocean Spray Co., Hanson, Mass., formerly used a belt conveyor to move carloads of cranberries from railroad platform to canning plant. But natural wax on the berries rubbed off on the belting. Both berries and belting suffered.

So the company built a concrete sluiceway about $\frac{1}{10}$th of a mile long to float the berries to the plant. And a pump was installed to move water through the 2-ft.-deep channel and back through a pipe line, in a continuous cycle.

Now the berries not only are moved without damage, but are washed clean at the same time.

The pump is a Deming side-suction centrifugal, of the two-ball bearing type.—*Deming Co., Salem, Ohio*

Lazy-Susan Flavor Rack

We work with over 500 sample bottles of flavors and essential oils in our laboratory. An efficient method of storing them became a problem, for we did not want to use a stationary, space-robbing flavor console.

Flexibility was achieved by adopting a portable, circular, multishelf rack from our machine shop. Rack had compartments (which we removed) for storing nuts, bolts, screws, washers, etc.

The metal rack comprises four independently rotating circular shelves, each with 6 ft. of space. Mounted on rubber, ball-bearing casters, the rack can be easily moved to any part of the laboratory.

Areas are alphabetically labeled on shelves for orderly storing of flavors—the "A" spot, say, for flavors beginning with the letter "A," like anise.—*A. B. Cramer, Chief Chemist, F & F Laboratories, Inc., Chicago.*

Cleans Filter Press Fast

Downtime for cleaning a plate and frame filter press is reduced with disposable filter paper which covers the cloths during filtration. Thus, the time-consuming operation of cleaning the cloths is eliminated.

In practice, the paper is cut to the contour of the cloths and fitted over them in the press. It then simulates the function of the cloth in receiving the precoat and supporting the press cake.

(Turn page)

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AUGUST PRACTICAL IDEA WINNER was "Easy Way to Measure Tank Contents", submitted by Mehl Renner, Chief Engineer, Southern Dairies, Atlanta, Ga.

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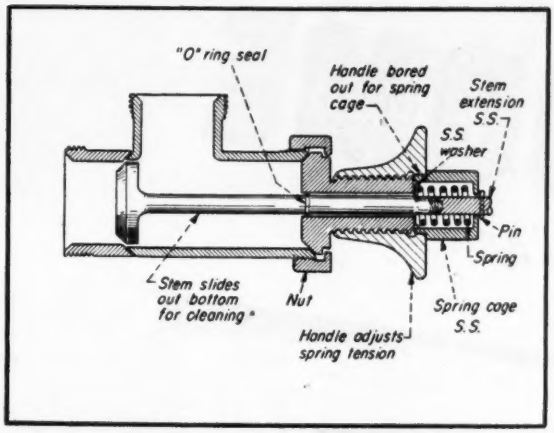
Cleaning of the press is faster because the operator merely removes the paper from the cloth and the cake drops off with it. Now, with no cloths to clean, new paper is applied and the press is ready for the next batch.

The particular type of filter paper required will vary with the nature of the slurry.—*FE staff.*



Versatile Sanitary Relief Valve

To maintain positive pressure on a heater setup to prevent flashing, we needed a 3-in. relief valve that would meet the rigid sanitary requirements of a dairy plant. The setup involves heating to 230 deg. F. with two heaters, one open unit and one pressurized hot well.

So we converted a Tri-Clover compression valve to a sanitary spring-loaded relief valve, and it has been operating perfectly.

This conversion unit, incidentally, has a wide potential application as safety or pressure-control valve for such food processing equipment as heaters, hot wells, separators, concentrate pumps, and recirculation systems.

Here, step by step, is how the valve conversion was made (see diagram):

1. With valve stem and bonnet in place, tighten sanitary nut. After making certain that valve is seated, place a mark on stem $\frac{1}{8}$ in. above top surface of bonnet.

2. Carefully note dimensions and construction of hand-operated nut so that an insert may be made after handle has been bored to take a spring cage.

3. Select a spring with sufficient compressibility to fully open valve when handle is approximately in half-open position, and with range enough for the specific application involved.

4. Turn handle to fully open position, put spring into place and measure distance from top of handle to top of spring. This determines length of spring cage. Allow an extra $\frac{1}{4}$ in. for a washer which goes under spring and applies tension to stem of valve. Bore spring cage adapter stem hole about $\frac{1}{8}$ in. smaller than valve stem.

5. Remove stem and thread stub end (S.A.E. thread, square shoulder). Turn stem $\frac{1}{8}$ in. under stem size down to mark made in Step 1. Bore a stainless steel washer to slip down over stem to shoulder, O.D. to be free sliding fit inside spring cage.

6. To provide a guide, adapter stem should be long enough to extend about $\frac{3}{4}$ in. through spring cage with valve closed and handle fully open. Making O.D. of adapter the same as turned portion of stem permits washer to slip off. This allows removal of stem by taking off 13-H Hex. nut. A small pin through threaded section locks stems together.

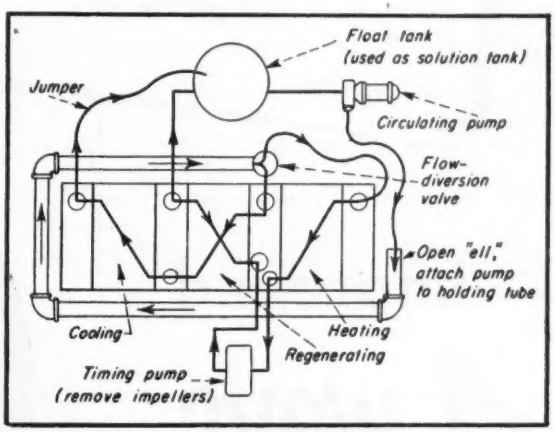
7. Assemble complete valve and screw handle to closed position. Bore a small hole through stem just above spring cage. A pin, inserted in hole, opens valve manually.

By replacing spring with a spacer, unit is restored to a positive valve.—*Arthur W. Paulette, Plant Engineer, H. P. Hood & Sons, St. Albans, Vt.*

Roof Spray Cools Room

In hot weather, temperature of a top-floor room, such as a laboratory, can be reduced by a simple water spray on the roof of the building. Advantage is taken of the cooling effect produced when water evaporates from a surface, and the hot roof provides the heat of evaporation at the rate of 970 Btu. per pound.

Only requirements are a water tap and a length of perforated spray hose, such as is used to water lawns. A garden spray with a rotating head is also effective.



Split Flow Protects Gaskets

As more and more dairies and food processing plants are going to in-place cleaning, health departments are setting up certain specifications for the cleansing process.

At the present time in our locality, the specified velocity of the cleaning solution in the largest pipe is required to be a minimum of 5 fps. This velocity may easily be maintained in stainless steel tubing. However, a definite problem is encountered in the cleaning of a plate-type high temperature-short time pasteurizer.

In this type of apparatus, the 15-sec. holding tube usually is of $2\frac{1}{2}$-$3\frac{1}{2}$ in. dia. And the gaskets in a plate pasteurizer could never stand the high pressure that would be created by moving enough water through the plate to maintain a 5 fps. water velocity through the holding tube.

To remedy this problem, we have devised a method of using the flow diversion valve, and splitting our flow, to eliminate the hazard to the plate gaskets.

The diagram shows the circuit that permits safe and effective cleaning. The float tank is used as a solution tank, and cleaning solution (at the necessary gpm. to maintain our velocity) is pumped directly to the holding tube.

With the core of the flow-diversion valve removed, the flow is split in half at this point. To complete the circuits, a short hose jumper is installed from the cooling section to the solution tank, and from the flow diversion valve to the heating section.

By operating the heating section to maintain solution temperature, we properly clean the holding tube and the entire plate pasteurizer without pressure hazard.—*John J. Buhr, Sales Engineer, Creamery Pkg. Mfg. Co., St. Louis.*

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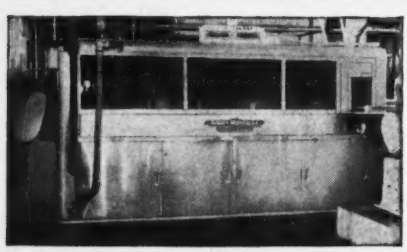

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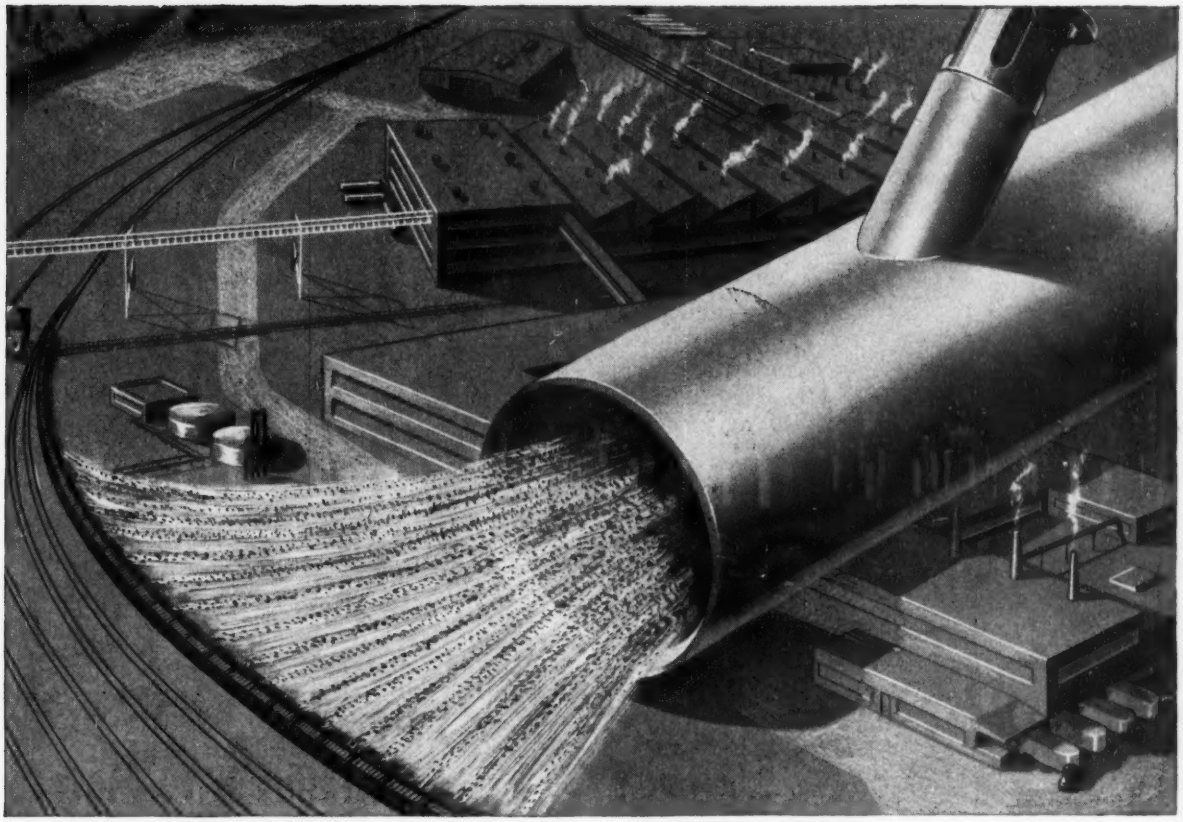

FEED PLANT PULLS IN PROFITS ...from 30 cars per day

A costly operation at a midwestern feed producing plant was the unloading of bulk raw materials—bone meal, grain splits, fish scraps, dried blood, alfalfa meal and many others.

Each day some 30 carloads of materials had to be removed from railroad cars and trucks and transported to a central storage area. Unloading points were widely separated and at distances of 200 to 400 feet from the plant.

This materials handling nightmare was neatly solved by three Dracco "Airstream" Conveyors . Now, materials are picked up at eight separate points, conveyed to the plant and distributed to desired bins by mechanical conveyors. The three "Airstream" systems function individually, each being coordinated with the others to handle 1200 tons daily.

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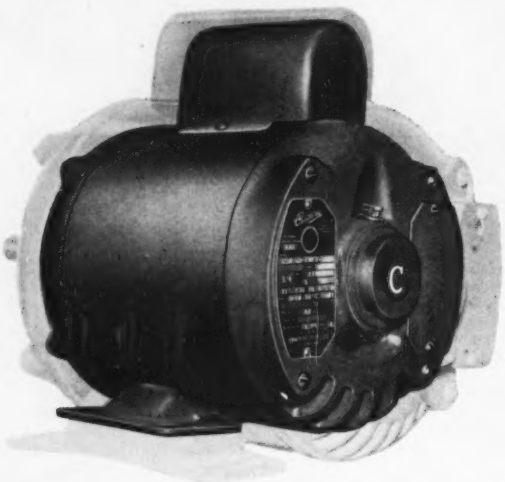

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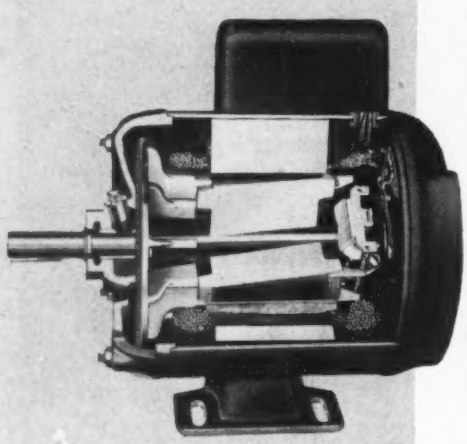

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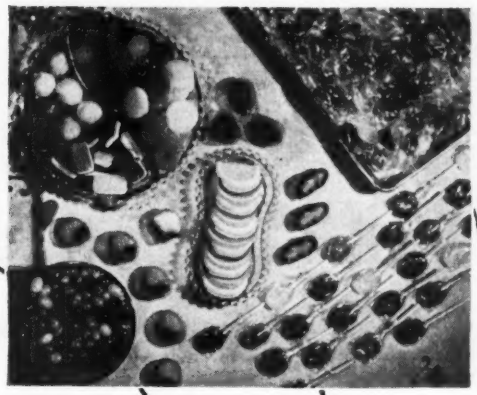

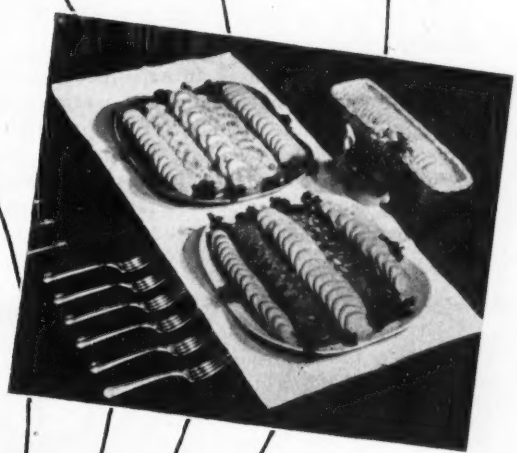

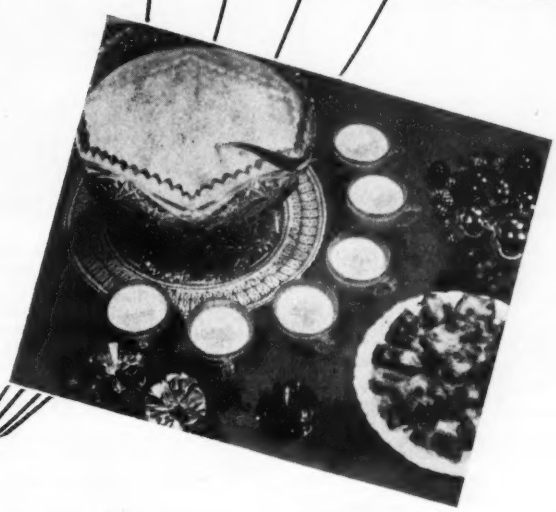

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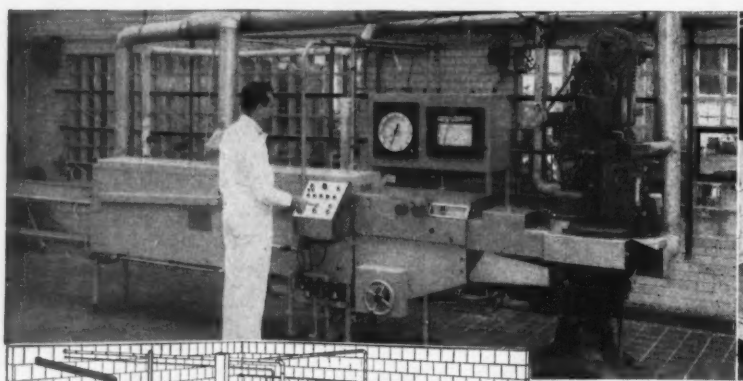

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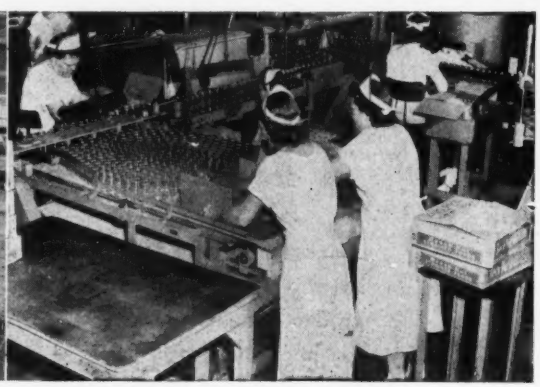

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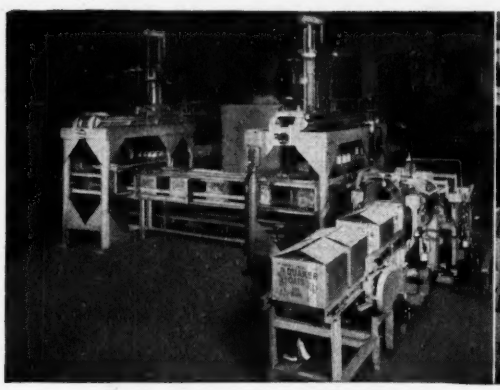

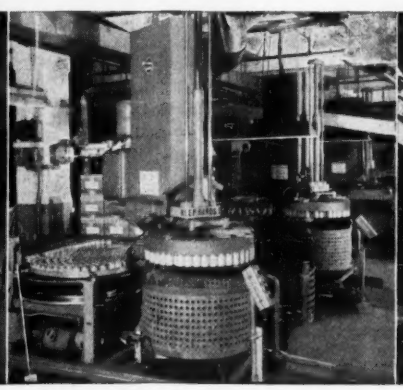

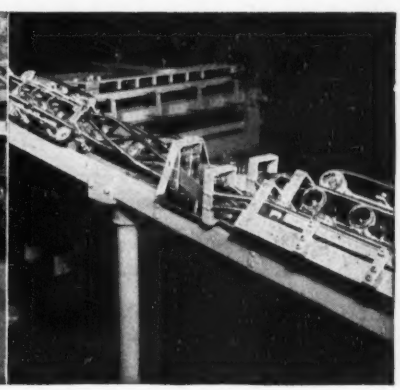

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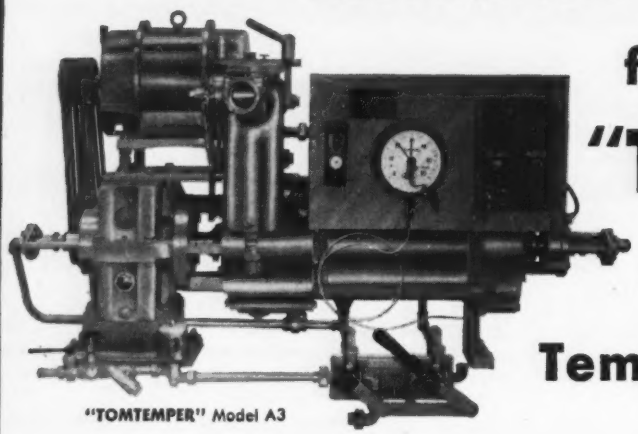
Revolutionary...



"TOMTEMPER" Model A3

fully automatic "Tomtemper" Chocolate Tempering Machine

It Guarantees More Attractive Finish – Finer Fracture – Better Taste

JUST LOOK WHAT THE "Tomtemper" OFFERS:

FULLY AUTOMATIC OPERATION Easy to operate. Requires only one adjustment.

MINIMUM PROCESSING TIME Combines undercooling with intense mechanical mixing to achieve ideal tempering cycle at lowest possible viscosity.

FAST START UP Delivers correctly tempered chocolate less than 4 minutes after starting.

FAST CHANGEOVER Switches from one type of chocolate to another in 3 to 5 minutes.

HIGH OUTPUT Up to 3600 pounds of chocolate per hour; 5000 pounds per hour with accessory cooling.

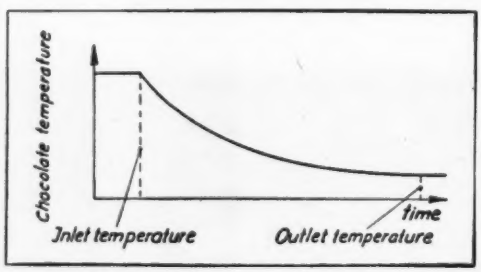
SMALL SIZE Measures approximately 47" x 22" x 20".

ABSOLUTELY HOMOGENEOUS TEMPERING Exposes every particle of chocolate to same tempering treatment.

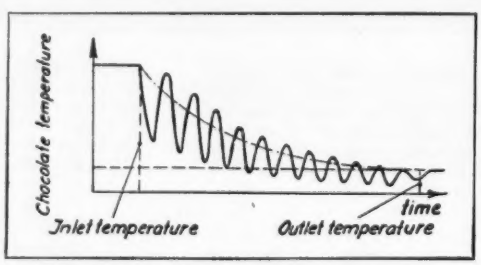
GUARANTEED ACCURACY within ± .9°F of desired temp.

And these are but a few of the many outstanding features offered by the *"Tomtemper."*

"TOMTEMPER" Thin-Film Tempering Machines are manufactured by TOM'S Laboratory LTD. which also manufactures a line of Fancy Molding Plants and Chocolate Chip Making Machines.



AVERAGE TEMPERATURE of chocolate as it progresses through the *"Tomtemper"* is shown above.



UNDERCOOLING AND MIXING Graph above shows how *"Tomtemper"* achieves the outlet temperature by undercooling and mixing.

GEVEKE & COMPANY, INC.

25 BROADWAY, NEW YORK 4, N. Y.

MANUFACTURERS' REPRESENTATIVES • SPECIALIZED MACHINERY AND EQUIPMENT • FOUNDED AMSTERDAM 1876 •

FOR STEADY ACTION

...for steady packaging performance
J&L STEEL CONTAINERS
ARE ON THE TARGET

When you specify J&L Steel Drums and Pails you are assured of maximum protection for your product. In terms of "steady action" you can depend upon J&L because:

1. J&L Drums and Pails are made from high quality J&L Steel Sheet.
2. J&L Drums and Pails are made with care and accuracy in every detail.

You can obtain J&L Steel Drums and Pails through plants located in leading industrial centers. You'll find J&L service fast and efficient.

The J&L line includes all types of Closures and Finishes. Bright, colorful decorations may be reproduced to your specifications. Heavy-duty ICC Drums. Light-gauge Drums. 55, 30 and 15 gal. capacity and 100-lb. Grease Drums. Lightweight Drums for Chemical and Powdered Materials. 1-10 gal. capacity Steel Pails for Foods, Chemicals, Oils.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*
CONTAINER DIVISION
405 Lexington Ave., New York 17, New York

For more information, use coupon on page 233.

INTERNATIONAL Announces

12 NEW COE MODELS

Available in 3 series of 4 models each. Wheelbases from 99 to 153 inches. GVW ratings, 21,000 to 30,000 lbs. Famous INTERNATIONAL power, including new 201-hp Royal Red Diamond engine in CO-220 series.

Built with famous INTERNATIONAL all-truck quality to provide greater payload profits

INTERNATIONAL, the heavy-duty leader, brings truck operators new features for payload profit—in an entirely new line of heavy-duty COE trucks.

These all-new INTERNATIONALS make the most of every COE advantage. Short-coupled design permits the use of 35-foot semi-trailers well within the usual 45-foot over-all length limit. In straight truck operation shorter over-all lengths for given body sizes mean easier maneuvering and parking. Better load distribution provides more payload capacity on front and rear axles for more profit.

What's more, these new INTERNATIONALS give you maximum service accessibility, driver comfort, better visibility, and greater safety. With famous Red Diamond truck engine power and proved INTERNATIONAL stamina, economy and long life, these new COE models will lower your maintenance and operating costs and boost your payload profit.

Get complete details and an "on-the-job" demonstration from your INTERNATIONAL Dealer or Branch.

Greater Maintenance Economy! Newest COE counterbalanced cab swings forward to give complete access to engine, transmission, clutch and other units for reduced servicing time and costs. One man can swing cab forward easily with one hand.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

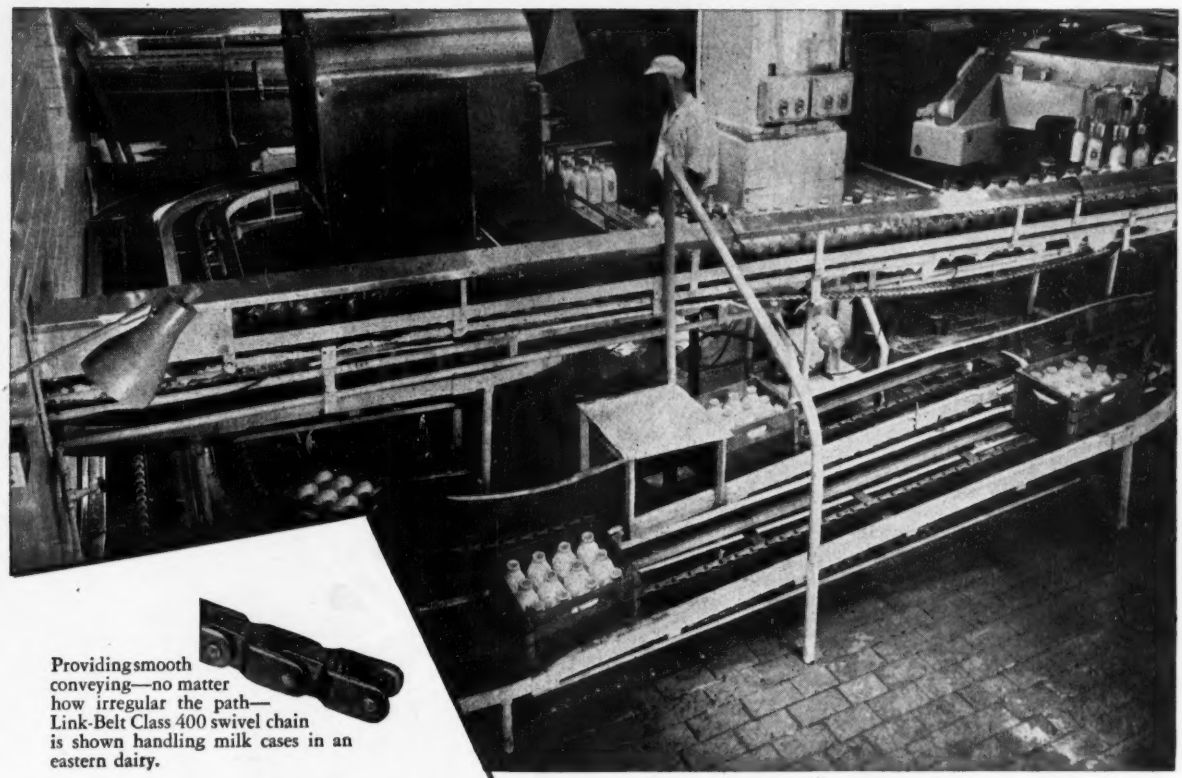
International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

See the season's new TV hit, "The Halls of Ivy," with the Ronald Colmans, Tuesdays, CBS-TV, 8:30 p.m., EST, starting October 19th

INTERNATIONAL® TRUCKS

"Standard of the Highway"

Around corners . . . over vertical curves--
Link-Belt swivel chain assures smooth travel



Providing smooth conveying—no matter how irregular the path—Link-Belt Class 400 swivel chain is shown handling milk cases in an eastern dairy.

No ONE chain serves every purpose — choose the right one from the complete line

Class RC universal crescent flat-top chain can be used for multiplane operation traveling variety of paths.

Class RC flat-top chain —precision made for smoothest, spill-free carrying and long life.

S-815 flat-top conveyor chain — economical, sturdy, reliable, easy to detach and to keep clean.

Class RC crescent flat-top chain — travels in horizontal planes, around corners; ideal for bottles and cans.

LINK-BELT offers the chain that's best for every job

HERE'S an economical conveyor chain that's widely used for moving cases, cartons, cans, etc. In addition to its horizontal and vertical flexibility, this Link-Belt swivel chain can be assembled or uncoupled without the aid of tools.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw materials and manufacturing processes is your assurance of uniformity, longer life.

For complete information on chains and sprockets for conveying or drive service, see your Link-Belt sales representative. He can show you the *one* chain that's best suited to your exact requirements.

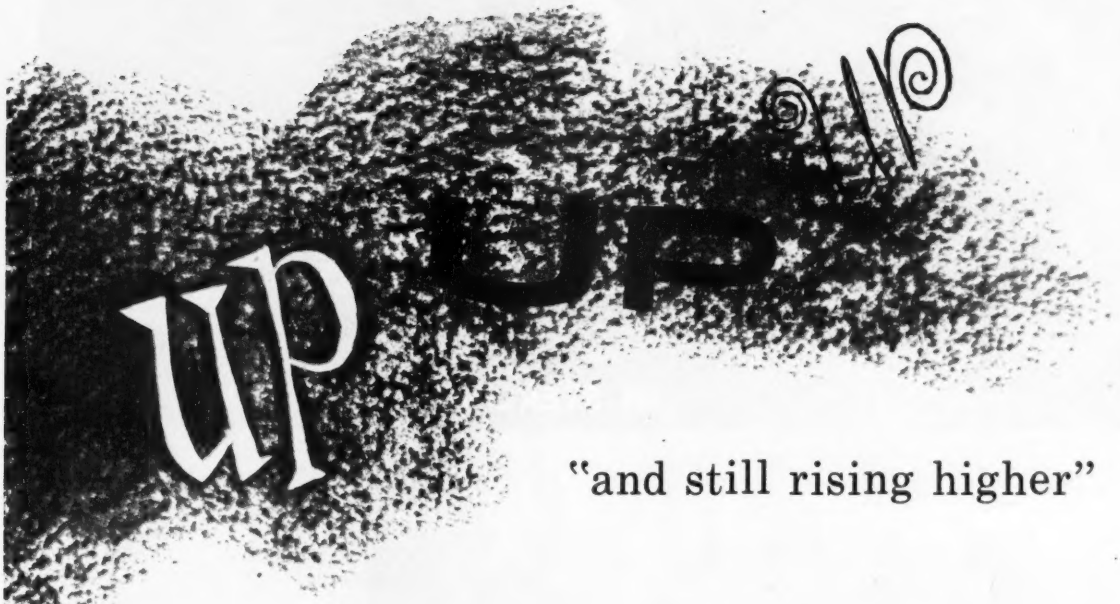
LINK-BELT

CHAINS and SPROCKETS 13,340

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more information, use coupon on page 233.

For more information, use coupon on page 233.



"and still rising higher"

Your market for SUCARYL® sweetened foods

(Cyclamate, Abbott)

Ever since its launching SUCARYL has been exciting news. And every day industry interest increases in this non-caloric sweetener which gives true sugar-like flavor without added calories or tell-tale bitterness. Bottlers and canners all over the country are proving there's a ready-made market for SUCARYL-sweetened products . . . with generous profit. Statistics show it's a huge market . . . at least 25 million strong.

With this enormous potential, there's still plenty of room for more dietetic products. Now is the logical time to launch your own line . . . to implant your brand name in the minds of ready-to-buy, diet-conscious customers.

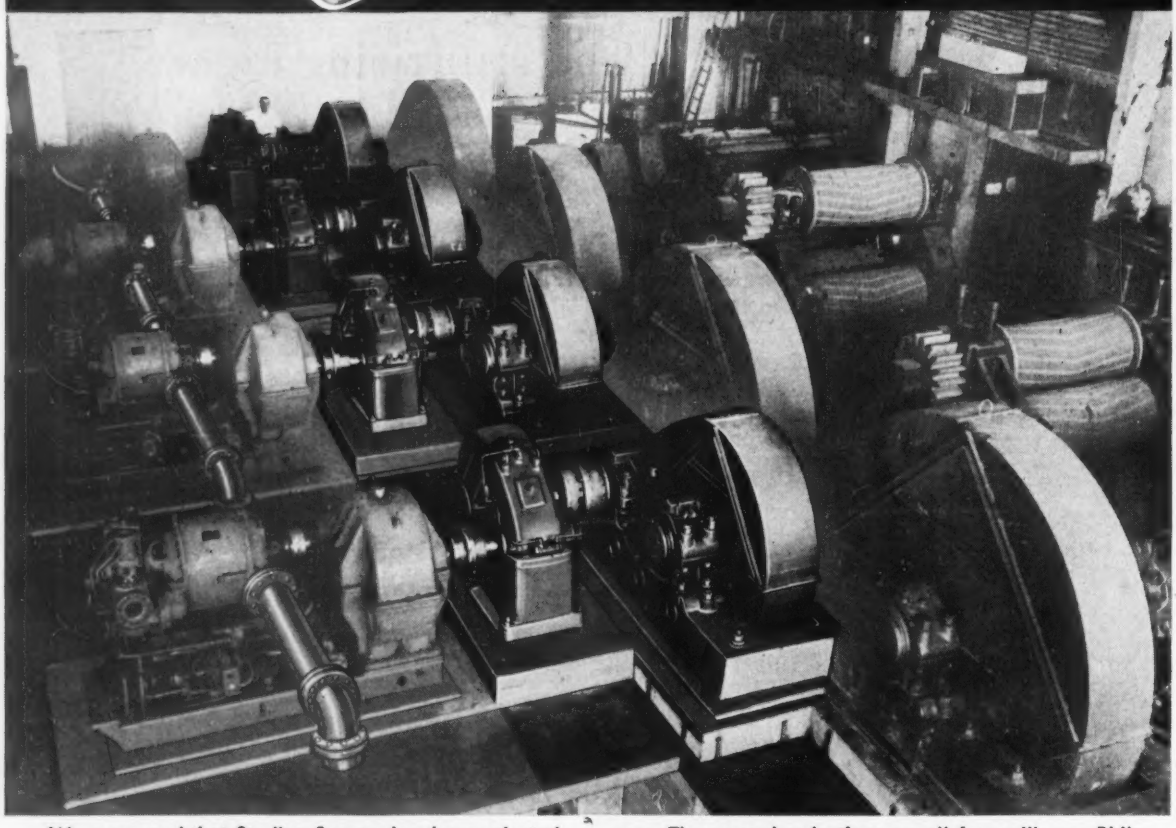
If it's facts you're lacking, we'll be happy to supply them. Write for your free copy of the booklet, "Making the Most of the Dietetic Market with SUCARYL." Chemical Sales Division, Abbott Laboratories, North Chicago, Illinois. Abbott

ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

For more information, use coupon on page 233.

8 more HERRINGBONE REDUCTIONS by PHILLIE GEAR

IN STERLING SUGARS, INC.



We are proud that Sterling Sugars, Inc. have selected Philadelphia power transmission equipment for their fine new installation at Franklin, Louisiana.

These new turbine driven crushers are indicative of many such installations in the South. The mills are driven by multi-stage turbines 600/800 horsepower at 4000 rpm. The second reductions on all four mills are Philadelphia Herringbone Speed Reducing Units, while the final reductions are Philadelphia Herringbone Gears with metal covers.

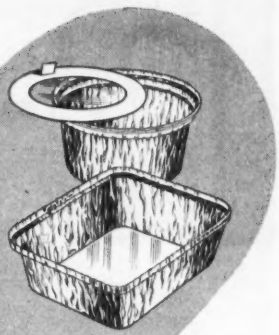
Write for further information regarding Philadelphia Gears and Speed Reducers.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

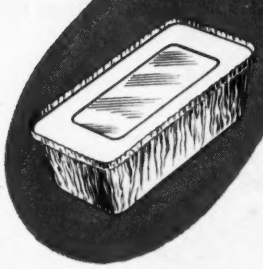
Industrial Gears and Speed Reducers
LimiTorque Valve Controls



every product has been designed is

for which an EKCO-FOIL CONTAINER-PACKAGE earning increased sales and profits!

YOU CAN BE THE NEXT TO PROFIT FROM EKCO SKILL AND IMAGINATION!



Ekco has been designing and making quality metal containers for more than 67 years. This long experience, combined with skill and ingenuity, makes Ekco best qualified to help you sell more, *make more money*, with rigid aluminum foil packaging.

Ekco has 105 sizes and shapes of rigid aluminum foil containers for you to choose from, and only Ekco can make them for you in quantity. Ekco has the industry's most modern and complete facilities to serve you better!

At no cost to you, an Ekco packaging engineer will point out the possibilities, or, quite frankly, the limitations of aluminum foil packaging for your product. Let him show you what Ekco-Foil can do for *your* business!

Send us your package. Let Ekco packaging engineers examine it and make recommendations that can increase your profits!

cut costs, increase profits!

Ekco-Foil, the newest idea in "convenience foods" packaging, reduces handling, maintenance, and costs! Your product sells faster, too, because Ekco-Foil retains flavor longer. It gives greater taste appeal and a clean, distinctive appearance. Process and sell in the same container-package! Call your Ekco salesman or distributor today!

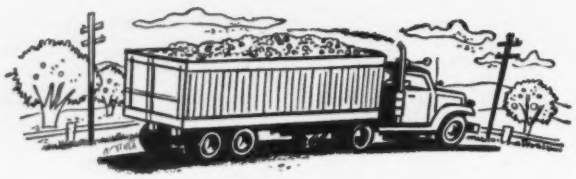
EKCO®

EKCO-FOIL CONTAINER DIVISION

Ekco Products Co., 1949 Cicero Ave., Chicago 39, Ill. • Also available from Ekco Products Co. (Canada) Ltd., Toronto

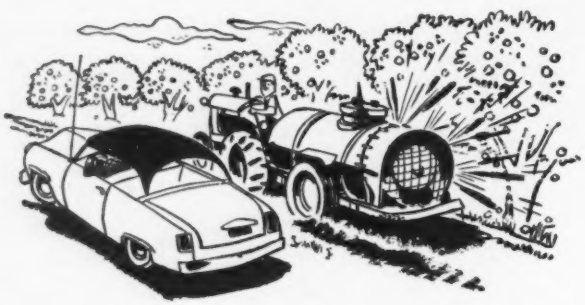
For more information, use coupon on page 233.

12 REASONS FOR G-E 2-WAY RADIO AND CONSTANT "HOUSE" CONTROL



- Co-ordinate the flow of produce for processing
- Eliminate deadheading . . . obtain payloads every trip
- Gear your picking to "house" capacity perfectly
- Unify all sales, loading and produce operations

- Convert idle hours to picking time
- Re-route crews and equipment
- Control harvested *quantity*—reduce spoilage
- Relay new orders to fields instantly



- Insure top *quality* via contact with field buyers
- Start or stop work in seconds
- Speed vehicle repairs . . . dusting . . . fertilizer etc.
- Know crop maturity virtually as fast as the field does

Actually, there's no limit to the number of ways mobile radio will improve food processing efficiency. You can think of a dozen more than those listed here. And, each can save one or one thousand man-hours . . . a hundred or many hundreds of dollars depending on the size of your operation.

For completely new processing efficiency, see General Electric 2-way radio communications in action. Compare performance . . . compare features of all mobile equipment and watch the points pile up for G.E. A phone call now to our local sales office is the first step . . . the right step toward achieving *constant control.* Or write: *Section X70104, General Electric Company, Electronics Park, Syracuse, N. Y.*

2-WAY MOBILE RADIO

FREQUENCY STABILITY & SELECTIVITY
guaranteed for life!

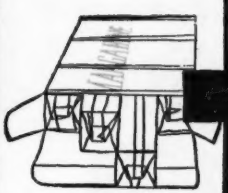
Progress Is Our Most Important Product

GENERAL ELECTRIC

For more information, use coupon on page 233.

Monsanto Sodium Benzoate

3 places to use it profitably



Margarine

Concentrations of 0.10% of Monsanto sodium benzoate are used to reduce the risk of rancidity and darkening during shipment or in high-temperature areas. Vitamin content of the margarine is not affected.

Jams, Jellies, Preserves

Sodium benzoate improves their "keeping qualities," makes them last longer.

Beverages ... Fountain Syrups ... Fruit Juices

Use sodium benzoate at 0.1% for most of these products. Added immediately to the juice or pulp as it comes from the press, sodium benzoate helps control harmful fermentation without affecting odor or taste. Average concentration needed is 0.10%.

MONSANTO

SERVING INDUSTRY... WHICH SERVES MANKIND

Organic Chemicals Division,
MONSANTO CHEMICAL COMPANY,
Box 478, St. Louis 1, Missouri

Please send me your booklet on Sodium Benzoate.

Name.....

Address.....

City..... *State*.....

For more information, use coupon on page 233.

IT WORKS WONDERS IN MATERIALS HANDLING-

300 to 400% increase in efficiency

75% decrease in handling costs

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

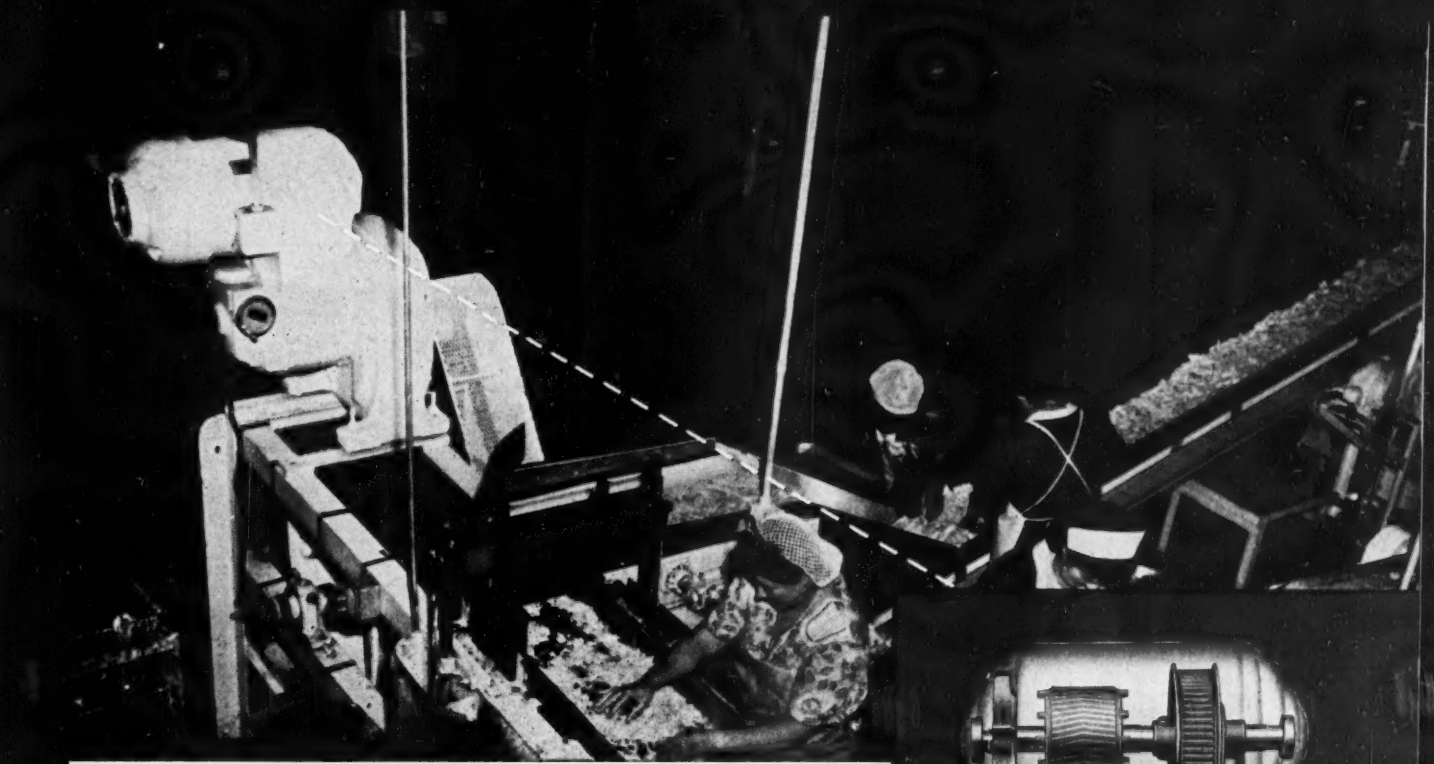
With the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster accomplishes more than several conventional dump trucks. You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised.

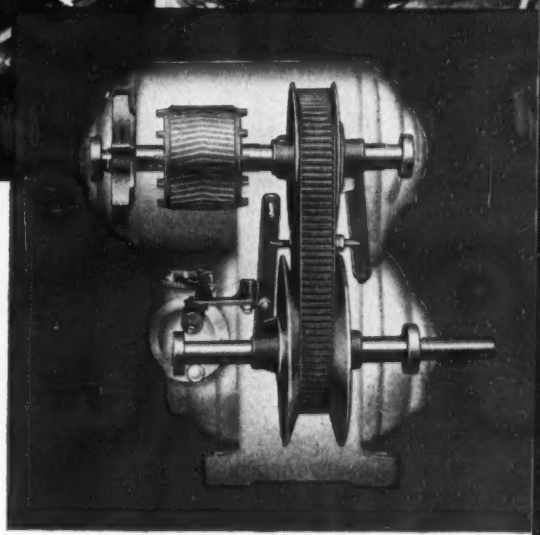
It's like having one truck with scores of bodies. One truck-mounted Dempster-Dumpster serves scores of detachable containers. These containers range from 2 to 21 cu. yds. capacity for use with recommended type Dempster-Dumpsters. Each container is designed to suit the materials to be handled—be they solids, liquids, dust, bulky, light or heavy. You simply place these containers at convenient materials accumulation points outside or inside buildings. As each is loaded, it is picked up, hauled and dumped (or load set down intact). Entire operation is handled by hydraulic controls in cab by only one man, the driver.

The list of manufacturers using the Dempster-Dumpster equipment reads like the "Who's Who Among the Nation's Leading Manufacturers". We mention this simply to point out that dozens of the nation's oldest and most successful firms use the Dempster-Dumpster System because of its efficiency and tremendous savings. Write to us now for complete information. Manufactured exclusively by Dempster Brothers, Inc.

Representatives in principal cities throughout the United States, Canada and foreign countries. There's one near by to serve you promptly.

DEMPSTER BROTHERS, 7104 Shea Building, Knoxville 17, Tennessee





PRODUCTION ON TUNA CLEANING LINE UP 20% AT WESTGATE-SUN HARBOR CO.

Speed-Trol variable speed drives increased production 20% and maintain our high quality of product, writes J. C. Miller, Superintendent of Westgate-Sun Harbor Co.... we adjust speed of cleaning line according to size of fish and therefore always operate at full capacity... labor and maintenance costs are at a minimum... Speed-Trol's streamlined design meets our high sanitary standards because it is easy to keep clean.

Speed-Trol...Variable Speed at its Best

OUTSTANDING FEATURES:

A Single, Compact Power Unit containing motor, variable speed transmission, with or without integral speed reducer—**Effective Cooling Systems** with direct-through ventilation, dual or internal cooling—**Positive Pulley Adjustment** for infinite speed variation, accurate speed selection and regulation—**Fingertip Control of Speed** with standard or remote controls—**Specially Designed V-Belt** for heavy duty, long life—**Protected Designs,** drip-proof, splash-proof, totally enclosed—**Rugged Construction** for continuous duty, permanent bearing alignment—**Streamlined** for easy cleaning, better appearance—**Interchangeable Mounting Dimensions** between constant and variable speed drives—**Versatile Mounting** for any position—**Smooth, Quiet Operation** through dynamic balancing; Herringbone Rotor; pre-lubricated, double shielded ball bearings—**Low Installation Cost** due to compact design, versatile mounting, interchangeable mounting dimensions.

20-PAGE ILLUSTRATED CATALOG ...Sterling Speed-Trol, Slo-Speed, Klosd and Klosd-Tite Electric Power Drives. Write for catalog No. K-419

There is a Sterling Electric Power Drive to Meet Virtually Every Requirement

Sterling Slo-Speed Electric Power Drives—for geared low speed at its best
Sterling Klosd and Klosd-Tite Motors—for constant normal speed at its best

STERLING ELECTRIC MOTORS

Plants: New York City 51 • Chicago 35 • Los Angeles 22 • Hamilton, Canada • Santiago, Chile
Offices and distributors in all principal cities

Our Nominee for SALES MANAGER of the Month

JERRY SCHARER,
Sales Manager, Star-Kist Foods, Inc.
Terminal Island, California

An outstanding combination of sales ability, imagination, merchandising know-how and progressive thinking has raised Mr. Scharer to his position of national prominence in sales management.

"No salesman is better than his product," says Mr. Scharer. "And in packaged food, no product is better than the flavor it offers the consumer. Flavor is the one ingredient that is absolutely essential to every processed food."

Yes, flavor is vital to sales success

Nothing is more important to steady food sales than *steady food flavor*. It's what makes satisfied customers. Satisfied customers are what make *first* sales lead to *repeat* sales!

Top-level food processors take no risks in their operations – they guarantee *flavor* with Ac'cent!

Ac'cent – pure monosodium glutamate – is the natural seasoning that builds flavor in all foods ... meats ... fish ... poultry ... vegetables. Ac'cent restores the fresh, natural flavor food had in its original state, then intensifies that flavor and keeps it – through processing – freezing – canning. Food gets to the consumer with all its natural goodness locked in!

Ac'cent retards loss of color, of texture, of moisture, too. Yet Ac'cent adds no flavor, color or aroma of its own. Try Ac'cent in your food processing.

HELP FOR THE ASKING

Our staff of 75 specialists is ready to assist you with your technical problems. If we can be of help, do not hesitate to write us.

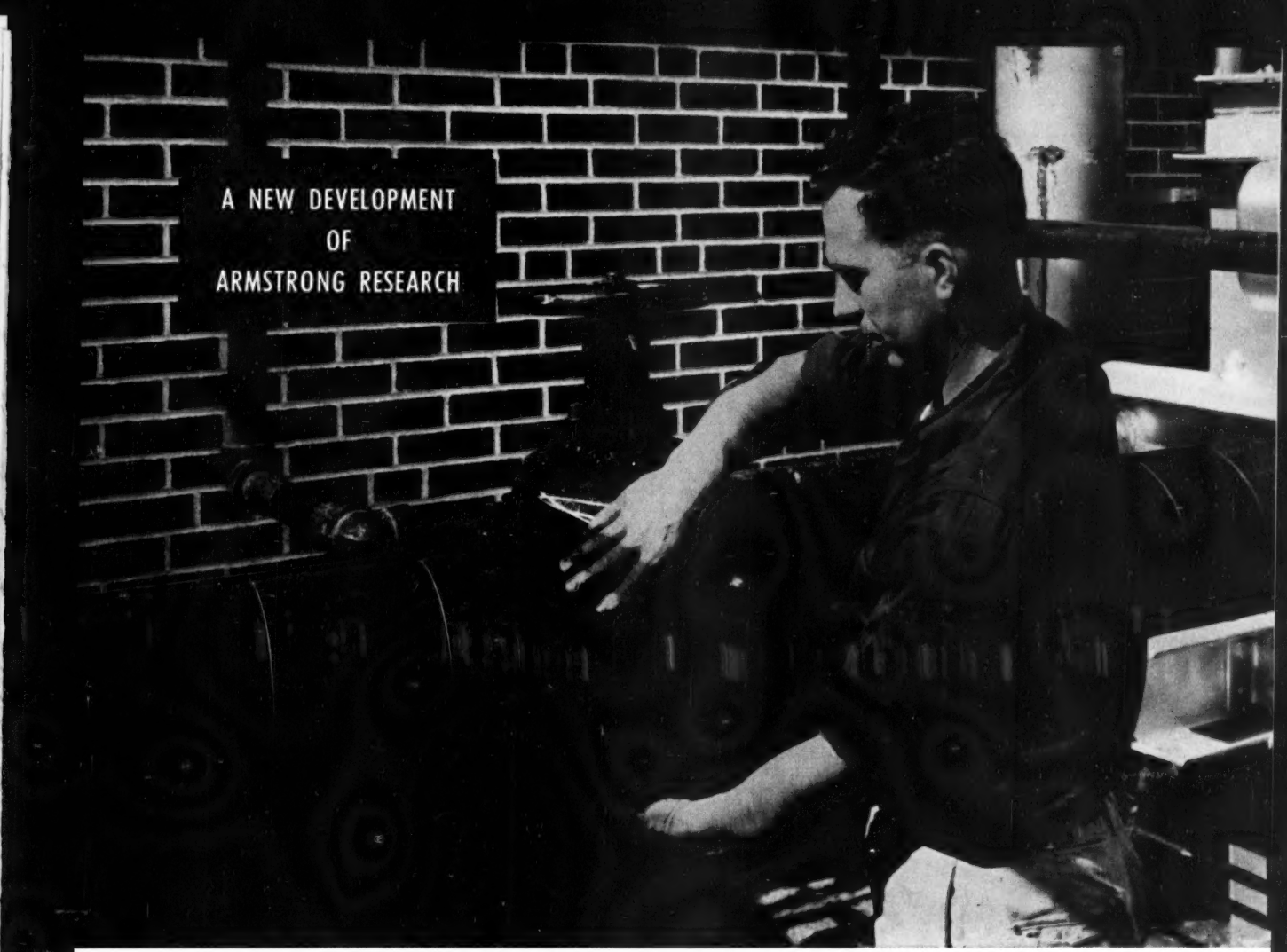
makes food flavors sing

Ac'cent®

PURE MONOSODIUM GLUTAMATE

AC'CENT INTERNATIONAL, 20 N. Wacker Drive, Chicago 6, Ill.

For more information, use coupon on page 233.



PLASTICORK · · · *a granulated cork-and-rubber insulation that can be molded to any cold line fittings*

Now you can insulate irregular fittings without having to cut standard molded covers on the job or wait while special ones are factory made. With Armstrong's Plasticork®, the workman just shapes the covers as he goes, speedily and efficiently.

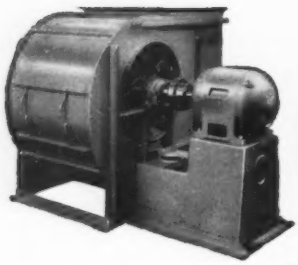
Plasticork is a granulated cork-and-rubber material made in sheet form. In covering a fitting, small chunks are pulled from a sheet and packed into all voids. Full insulation thickness is then built up with pieces or with full sheets, depending on the type of fitting. When finished, the fitting compares favorably in appearance and efficiency with a regular molded cover.

Plasticork is easy to warehouse. It can be stored indefinitely without loss of plasticity. It can also be removed from a fitting and used again without loss of its original insulating efficiency or workability.

Armstrong's continuing research in industrial insulations is helping to solve many high- and low-temperature insulation problems. For complete information on Plasticork, Armstrong's other industrial insulations, and Armstrong's Complete Contract Service, call your nearest Armstrong office or write Armstrong Cork Company, 204 Stratton St., Lancaster, Pennsylvania.

Armstrong's Insulcolor, a new plastic finish for insulated surfaces, is being applied to this Plasticork insulated fitting. Insulcolor can be used indoors or out, comes in a choice of seven colors and white.

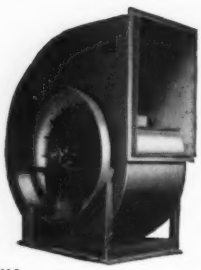
ARMSTRONG'S INDUSTRIAL INSULATIONS



DRAFT FANS

"Buffalo" mechanical Draft Fans are helping turn out low-cost steam in plants and major utility stations everywhere.

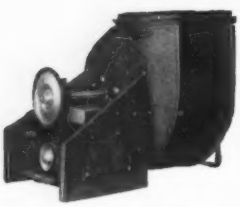
BULLETIN 3750



NEW!
TYPE "BL" FANS

In sizes for 1,000 to 500,000 cfm, these new non-overloading fans for general ventilation and air conditioning offer even finer performance than their famous predecessors, the "LL" Fans.

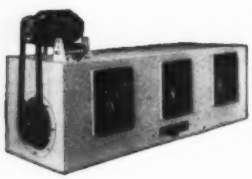
NEW BULLETIN F-100



BELTED VENT SETS

Non-overloading ventilating fans for duct or free air delivery. Extra quiet.

BULLETIN 3720



SHORTBOY VENTILATING SETS

Quiet, efficient, vibration-free fans. Wheels mounted on hollow shaft.

BULLETIN 3701

THE FAN for your JOB IS ON THIS PAGE

"Buffalo" Fans give "extras" in performance for two reasons: First, the line is so complete that you can pick — with mathematical accuracy — the fan to give you best possible results on almost any air moving job you could name. Second is the "Q" Factor, or inbuilt quality that "Buffalo" engineers have always insisted on. Why not have us mail you Bulletins on the right fans for your air job — from the complete line shown here?

"Buffalo" FIRST FOR FANS

. . . and for satisfaction in your PUMPING applications

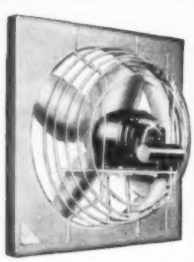
. . . check into "Buffalo" Centrifugal Pumps. Every industry depends on them. There is one to fit your hydraulic conditions. Representatives in principal cities.

BUFFALO FORGE COMPANY

152 Mortimer Street **Buffalo, N. Y.**

Publishers of FAN ENGINEERING Handbook

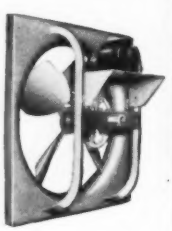
Sales Representatives in all Principal Cities



New! NV-BREEZO FANS

Their specially-shaped four-blade wheel gives high efficiency even against system pressures of ¼" and ½". 8" to 24" sizes.

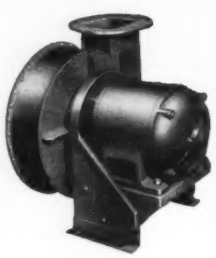
BULLETIN 3865



New! BELT-AIR FANS

Quiet, sturdy fans to move a lot of air at negligible cost. Heavy-gauge die-stamped blades and panel.

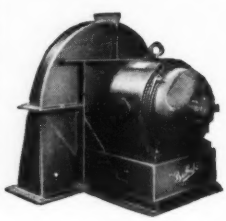
WRITE FOR BULLETIN



"CB" PRESSURE BLOWERS

Up to 2¼ psi, single stage with these husky, space-saving units!

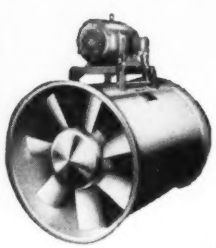
BULLETIN 3553



"CC" PRESSURE BLOWERS

In sizes for up to 4 psi, and capacities up to 75,000 cfm. Complete range of sizes, extra heavy-duty construction.

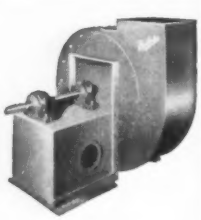
BULLETIN 3553



AXIAL FLOW FANS

Compact, light, highly efficient ventilating fans for light duty.

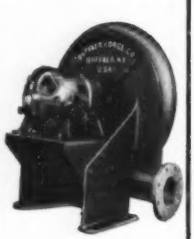
BULLETIN 3533



INDUSTRIAL EXHAUSTERS

All-welded for strength and high efficiency. With air or material wheels.

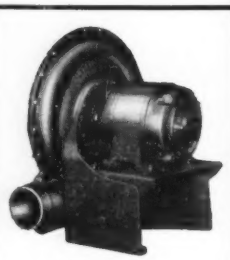
BULLETIN 3576



"RE" BLOWERS - EXHAUSTERS

For pressures up to 40" of water; 50 to 1600 cfm. Furnace blowing, line boosting.

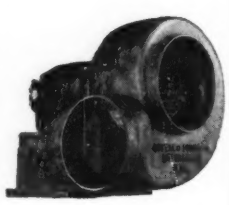
BULLETIN 3014



"E" BLOWERS - EXHAUSTERS

For low to medium pressures and volumes in draft, cleaning, line boosting.

BULLETIN 3014



BABY CONOIDAL FANS

Adjustable discharge, compact design, multi-blade rotors make these fans ideal for many small jobs.

BULLETIN 3576

VOLUME FANS

Rugged blowers-exhausters with cast iron housings and dust-proof ball bearings for any job up to 10" s.p.

BULLETIN 3615

Satisfaction rests on the carton

Separated by thousands of miles, families every day sit down to enjoy this favorite dish, secure in the knowledge of its consistent wholesomeness. Quality control is important to Stokely-Van Camp right through to the shipping containers which protect this largest selling brand of Pork & Beans on its way to the nation's markets. That's why so many Stokely-Van Camp products are shipped in dependable Union boxes, quality controlled from pulp to printing in the world's largest integrated Kraft container plant.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

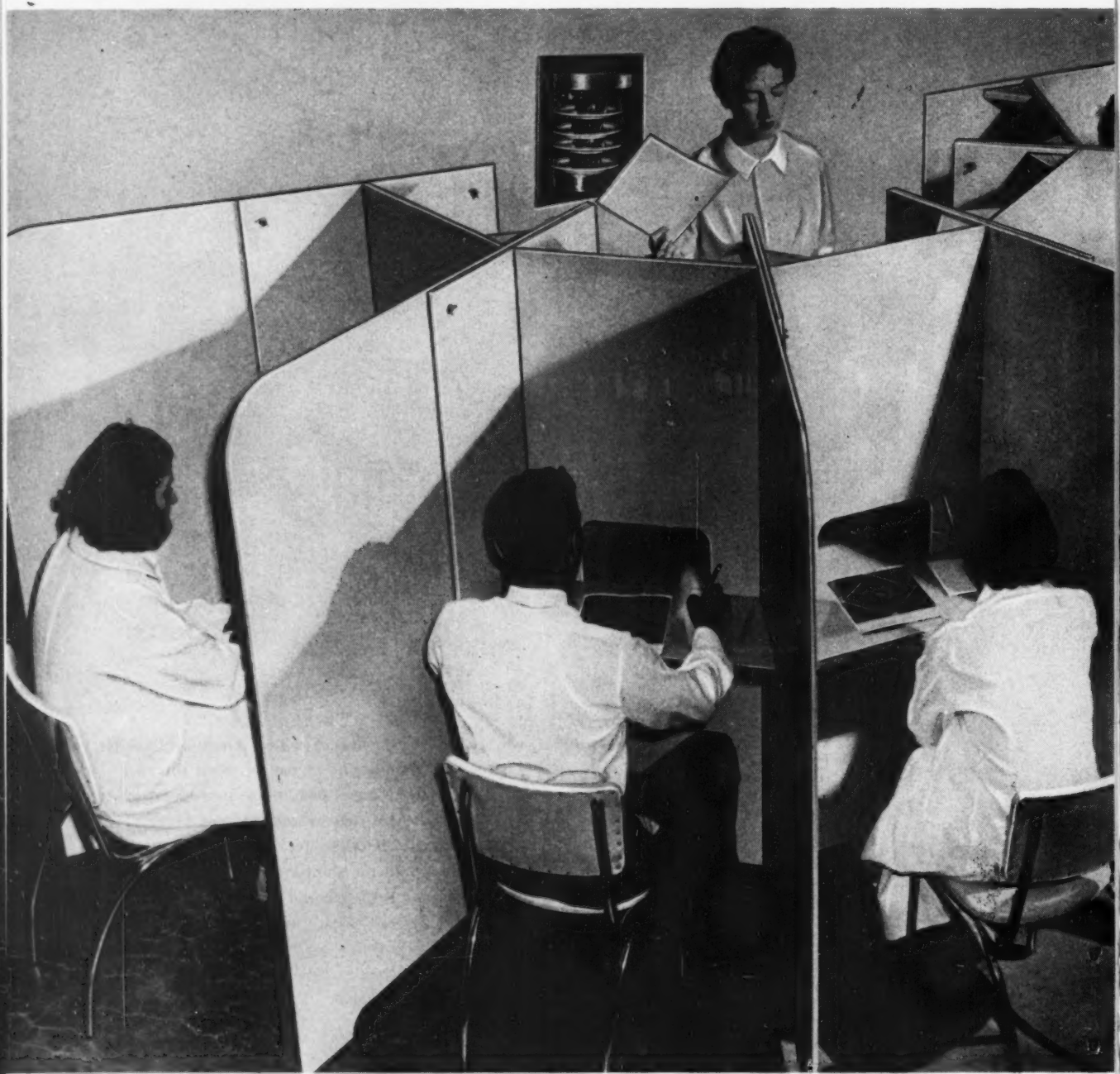
UNION BAG & PAPER CORPORATION

CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

For more information, use coupon on page 233.

BIG NEWS about



Rigidly controlled conditions are established for comparative analyses by United States Testing Company, Inc., Hoboken, N.J., in multiple testing stations like this.

FISH STICKS !

New taste test shows that MSG can double consumer preference!

Here's important news for everyone who makes, sells or buys frozen fish sticks.

Famous United States Testing Company, Inc., reports that you can *double* consumer preference for your fish sticks by simply adding MSG at the Huron-recommended level of .18%. This conclusion is based on a scientific taste test (Psychometric) of treated and untreated fish sticks.

What the test revealed

67% of the taste panel preferred fish sticks with MSG added at the .18% level, to 33% who chose the untreated samples. What's more, 67% also preferred MSG at the .18% level, while only 33% went along with sticks treated with .05 MSG (the "usual" level). This finding completely confirms the .18% level long advocated by Huron.

What the test means to you

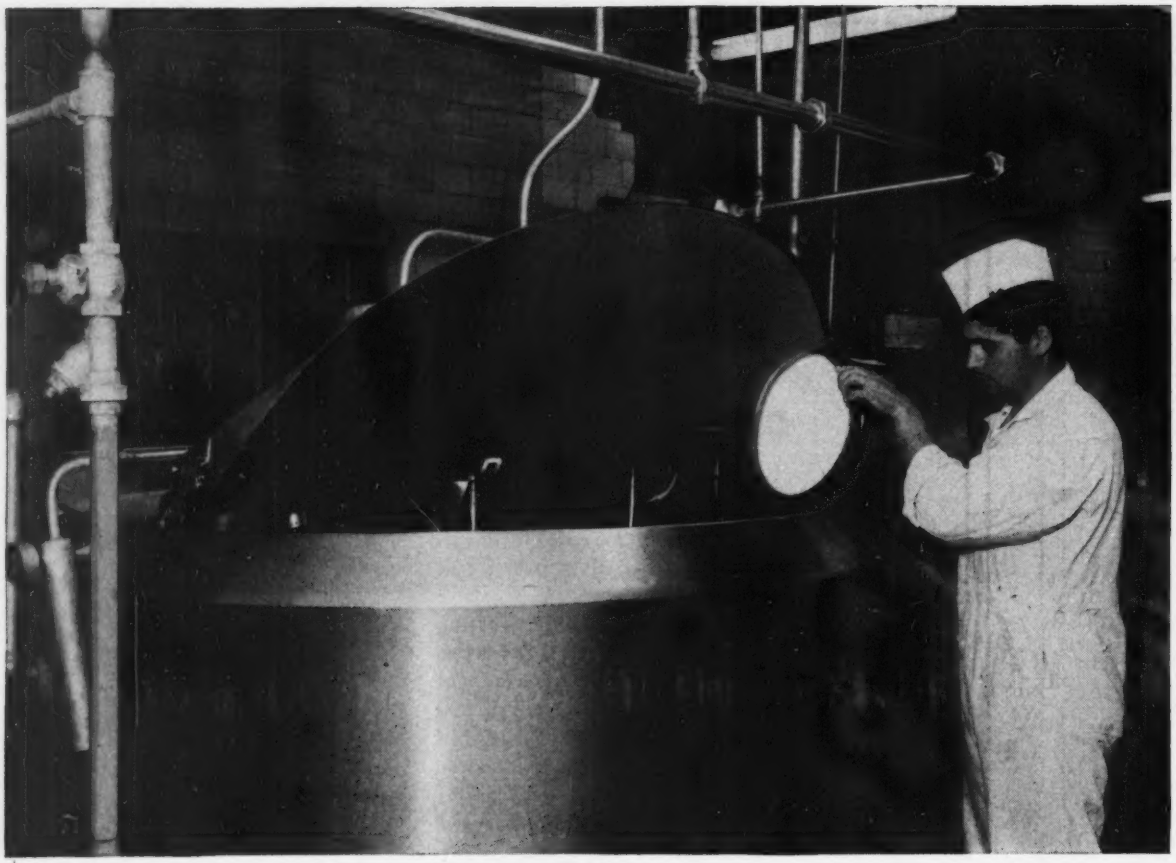
Whether you process, sell or buy frozen fish sticks, this test means you can actually "build in" your product a taste appeal that's preferred by twice as many consumers. That's a tremendous competitive advantage which is bound to put your product on top. It spells more sales . . . more profits in today's booming frozen fish sticks market. We'll be glad to send you a free copy of the United States Testing Company, Inc., report covering this taste test.

Don't forget — Huron MSG can heighten the flavor of most frozen foods — meats, poultry and vegetables as well as fish. Write or phone our Technical Service today for all the facts on this easy way to make your brand the one people prefer. THE HURON MILLING CO., 9 Park Place, New York 7, N.Y. 8.4.6

Huron **MSG**

Made by the American pioneers in protein derivatives

FACTORIES: Harbor Beach, Michigan
SALES OFFICES: 161 E. Grand Avenue, Chicago 11 • 13 E. Eighth Street, Cincinnati 2
383 Brannan Street, San Francisco 7.



can your processor handle 50 pounds of frozen product...in one lump?

You don't have to take time softening your product or breaking it into small chunks before you put it into a Cherry-Burrell Round Processor. You just dump the frozen ingredients into a predetermined liquid level.

The operator shown here is dropping 50 pounds of frozen cream into the processor. In minutes the Cherry-Burrell long sweep, two-speed agitator and bridge mounted baffle will dissolve this solid brick into a thoroughly blended liquid . . . without damage to product or agitator.

Superior agitation is just one of many reasons why you should know about Cherry-Burrell Round Processors. Whatever your product or your process, your Cherry-Burrell Representative can help you select the Round Processor that's best for you. Call him or mail coupon.

HERE'S WHAT YOU GET WHEN YOU CHOOSE A ROUND PROCESSOR FROM THE *COMPLETE* CHERRY-BURRELL LINE

Choice of Sizes: 200 to 1000 gallons.

Three Types of Heating: (1) Spray heating with steam vapor or recirculated hot water. (2) Pressure channel heating with hot water or steam. (3) Vacuum heating with air unloading of product.

Three Types of Cooling: (1) Spray cooling with well, city, tower or sweet water. (2) Channel cooling with refrigerated water. (3) Combination direct expansion and dump spray cooling.

Two Types of Agitation: Long sweep for heavy products. Scraper blade for extra-heavy viscous products.

Wide Range of Products including cream cheese, "Fiberglas" Binder, Fillings, Frostings, Ice Cream Mix, Icings, Marshmallow, Orange Juice Concentrate, Oils and Fats, Buttermilk, Chocolate Milk, Cream, Evaporated Milk, Market Milk, Skim Milk, Sour Cream, Sweetened Condensed, Superheated Condensed.

Full Range of Processes: Heating, pasteurizing, cooling, mixing, blending, holding, refrigerated storing, air unloading.

CHERRY-BURRELL CORPORATION
427 W. Randolph Street, Chicago 6, Ill.
Equipment and Supplies for Industrial and Food Processing
FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES

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Dept. 117, 427 W. Randolph St.,
Chicago 6, Illinois

• 5432

☐ Send Round Processor Bulletin

☐ Have Representative call

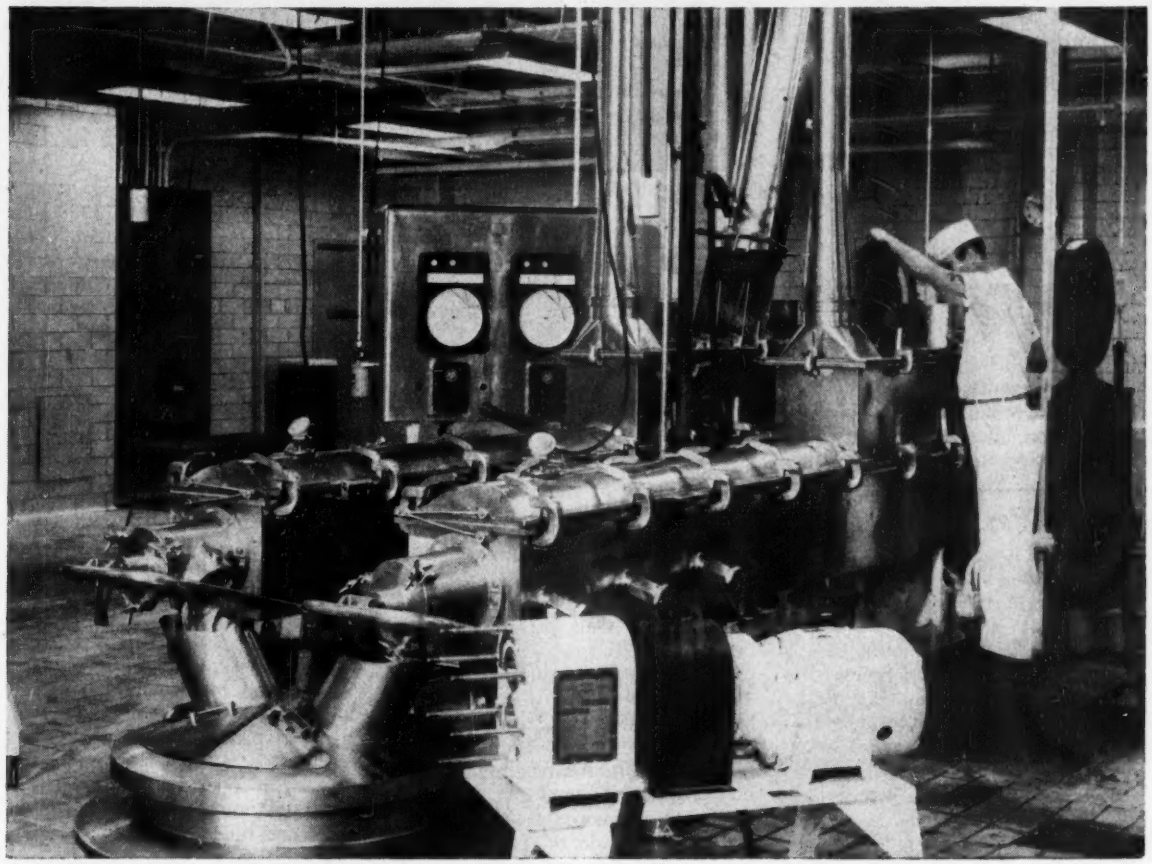
Name_____

Firm_____

Address_____

City_____ Zone_____ State_____

For more information, use coupon on page 233.



MODERN, efficiently-operated Kraft plants are designed to provide pleasant, sanitary interiors. Walls and ceilings are of gleaming tile and equipment of sparkling stainless steel. Note, here, the shining stainless cookers, which are easily dismantled for cleaning. Stainless exhausts, too, are readily "taken down" merely by loosening clamps at joints. Pump (foreground) is "off line" for careful going over.

Nine Key Factors Round Out

KRAFT SANITATION

R. C. CROSS and JOHN V. ZIEMBA

Respectively, General Manager, Quality Control, Kraft Foods Co., and Associate Editor, "Food Engineering"

"WE BEND OVER BACKWARDS in our unceasing efforts to keep our plants and processing facilities in shipshape order.

"And, at the same time, we lean over forwards in our never-ending search for adaptable, new and improved sanitary practices, materials, and equipment."

Thus top management at Kraft Foods Co. sums up the attitude that has made this quality-minded firm a pace-setter in food-plant sanitation.

What is the crux of the system? It is simply this: the policy of *preventing*—not merely *correcting*—insanitary conditions.

Today, sanitation literally permeates Kraft's. It involves inspecting all cheese-assembly branches, processing plants, independents selling dairy products to the firm, warehouses rented for storing supplies, sales branches, and even retail outlets.

Inspecting these multi-facilities is but a part of the broad routine of keep-

1. Organization
2. Inspections ★
3. Reports
4. Scoring
5. Construction
6. Housekeeping
7. Orderliness
★ 8. Cleaning
9. Pest Control

ing plants and operations in top sanitary order. Plant personnel also carry out scientifically planned orderliness, good housekeeping, clean-up, pest control, and waste disposal.

1—ORGANIZATION Centralized

Particularly notable is the dependable organization—curbing any doubts as to responsibilities.

The system is "mastered" through the general office manager of quality control (Chicago) and two sanitary engineers (also Chicago). Former answers only to executive vice-president and latter to general production managers heading processing of all company's seven divisions.

Sanitary engineers keep in constant contact with production technicians in each division, advising and instructing them on factors pertaining to sanitation. Significant problems these engineers handle are the applications of detergents and germicides for plant-cleaning operations.

"Way of Life"

Sanitation is a way of life. It is the quality of living that is expressed in the clean home, the clean farm, the clean business and industry, the clean neighborhood, the clean community.

Being a way of life it must come from within the people; it is nourished by knowledge and grows as an obligation and an ideal in human relations.—*The National Sanitation Foundation*

Of course, duties of quality control are bi-functional—(1) checking the quality of incoming "raws", products in process, and finished goods to make sure they comply with Kraft standards and (2) inspecting plants to make certain they meet rigid sanitary specifications.

To accomplish these tasks, quality control departments have been organized in every division. In each, a division quality control manager, with inspectors assisting him, perform their double duties. As for sanitation, these inspectors yearly check all plants in their division at least three times and sales branches twice.

2—INSPECTIONS Are Sharp

Let's see how an inspector goes about his sanitation duties.

Before visiting a plant, he checks his kit items: Flashlight, spatula, clipboard for 8½x11-in. paper, scratch paper, pencils, inspection-form pads, cap, white clothes, rubbers, thermometer, water-test-kit for checking hardness and alkalinity, kit for testing strength of chlorine solutions, and pHydrion papers for checking washing solutions.

He then schedules his plant visit—without advance notice—when about half the equipment has been cleaned. Upon arriving, he first contacts the plant manager. The inspection then proceeds in company with the manager or the superintendent or technician.

The inspector specifically refers to a copy of the previously answered inspection report to check for correction of former conditions not meeting standards.

3—REPORTS Tell Conditions

With the check-up completed, the inspector writes out his reports. In one report, he lists items requiring attention under the heading of "Housekeeping", as cleanliness of equipment, plant, and operations, as well as orderliness. Also listed are items under the heading "Repair Expense", pertaining to conditions of building, premises, and equipment, also correction of disorder.

4—SCORING Rates Plants

In rating a plant, averaged first are the number of housekeeping and repair-expense items requiring attention. This is done by dividing items in each heading by the number of areas or departments in the plant. Then obtained is the total average number of housekeeping and repair-expense items per department needing correction. To get the plant grade, total average number of items per department is multiplied by 10 and that figure is then subtracted from 100.

Say the average number of attention-needing housekeeping items per department is 1.00 and average number of repair-expense items per department is 1.18. Total average number of items per department is then 2.18. Then $2.18 \times 10 = 21.8$ and $100 - 21.8 = 78.2$, the plant score.

Plants then are graded on this scale: AA (95-100); A (88-94); B (75-87); C (50-74); or D (less than 50).

Before leaving, the inspector goes over the reports with plant manager, technician, engineer, and several foremen. Copies of reports are then issued to plant manager, division plant manager, and the general managers—engineering, production, and quality control—in Chicago.

Conditions cited as needing attention must be immediately corrected. A follow-up letter from the plant manager indicates the nature of action taken or to be taken (with dates as to when).

5—CONSTRUCTION Basic

Now let's look at a typical, modern Kraft plant in Chicago to see the role played in maintaining sanitary standards.

It is noted first off that walls in production areas are of glazed ceramic tile, which resists dust and dirt accumulations, prevents absorption of moisture that is conducive to mold and bacterial growth, and facilitates washdowns.

Floor in cook room is of non-slip, dairy-type, red tile, set in water- and oil-resistant cement with acid-resistant grouting. Floors in other production areas are cement-surfaced with hard-finished resin varnish to control "dusting", ease cleaning, and provide a pleasing appearance. Re-dressing of floors is ranged on a monthly to semi-yearly schedule, depending upon traffic through the department.

Each floor has a slope of 1¾ in. per 50 ft. to a central drain for each 1,000 sq. ft. Drains are equipped with basket-type screens and traps to avoid clogging and wet floors. Floor sewers and traps are daily cleaned and sterilized. Overflow from equipment is directly piped to sewers—not permitted to flow over floors.

Openings from production areas to plant outside are securely covered with screens (not over 20 mesh) to keep out insects. Doors are plain, panel-less, and self-closing, with hinges, stops, pulls, and push plates directly attached to faces.

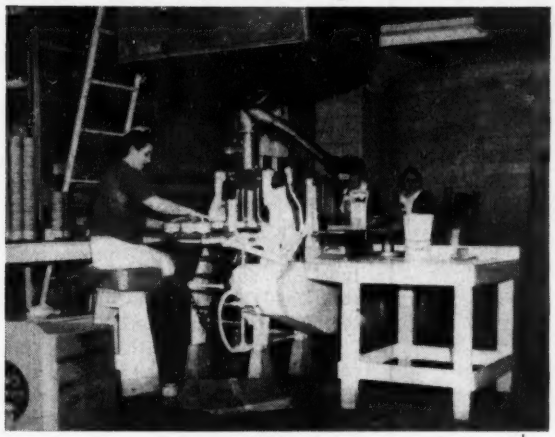
Conveyor openings through walls have self-closing doors to keep out insects and rodents.

Air circulating through production areas in this plant also gets the sanitation nod. Cook room and cheese-grinding areas, for instance, are served with three electrostatically filtered air changes per minute for each 1,000 cu. ft. of room volume. Air is drawn from outside, by a 20-hp. fan, through a penthouse enclosing mat filters and high-frequency electric arcs. Distribution is through aluminum ducts so installed from ceilings that dust won't collect on top of them. Adjustable dampers and louvres maintain desired flow through air meters to balance system and provide positive pressure in areas.

In filling, slicing, and packaging areas, the air is cooled by chilled water in an ethylene glycol system to provide temperatures 10-12 deg. below outside summer temperatures. Too, air is chemically purified to remove mold and bacteria. Air can also be heated to keep it at room temperatures during winter months.

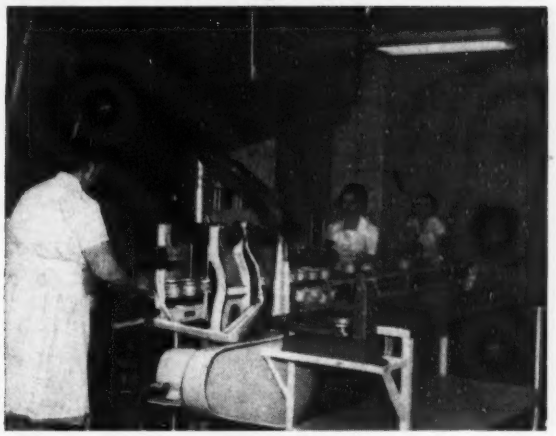
Lighting throughout process areas is at 15 to 20 foot-candles per sq. ft. to facilitate operations and clean-ups. Lights are protected by smooth-surface guards to curb clinging of dust and to prevent glass of broken bulbs from falling into foods.

Inspection Spots Irregularities–And Corrections Are Quick



From untidiness . . .

Check of this department showed disorderly items, wooden table, makeshift stool, and sweater girl.

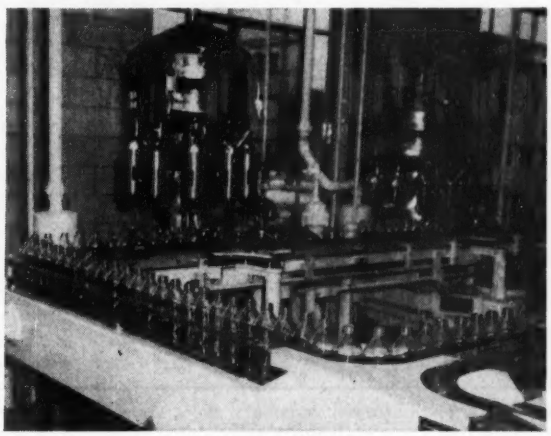


. . . to good order

But now things are shipshape—swiftly rectified after inspection. Stainless table has replaced wooden one.

And from poor practice . . .

Here, handfeeding (bottles to filler and closures to capper) drew censure, also wooden steps at capper.



. . . to dependable system

Whereupon a fully automatic bottle and closure feeding system was installed, accenting efficiency.

On a trip through the plant, one finds out-of-the-way places free from soil, excessive moisture, and insect or rodent breeding areas. Windows evidence frequent washing. There is no sign of dust, mold, algae, soil, or slime on floors, walls, and ceilings inside the plant. Nor is there evidence of condensate on walls, ceilings, or pipe lines.

6—HOUSEKEEPING Accented

According to Kraft, good housekeeping is perfect cleanliness–the most important aspect in the production of high quality products. Keys to attaining good housekeeping are, of course, found in the attitude and practices of plant personnel.

Those associated with processing in this company's plants know that plant sanitation and maintenance are treated as production problems. Accordingly, heavy production schedules are arranged to provide more than a limited amount of time for clean-up and maintenance duties.

Employees are taught to fully understand the use of cleaning agents as well as to adhere to policies and procedures pertaining to plant sanitation.

Plant and equipment designers take into full consideration *sanitary perfection* as well as *mechanical perfection* when planning or building processing equipment.

7—ORDERLINESS a Must

There is an atmosphere of orderliness in this typically sanitary plant. In fact, Kraft feels that the basis of good housekeeping is orderliness–"having a place for everything and keeping everything in its place."

Suggested to all personnel is this plan:

A. Keeping premises well landscaped, clean, and free, from all clutter.

B. Choosing a place for each piece of equipment or carefully observing already allotted spots. Then making certain that equipment is placed there –and in a clean, good shape.

C. Hanging hoses on racks.

D. Putting cleaning cloths in their holders, as well as brooms and brushes in proper utility closets.

E. Tacking posters only on bulletin boards.

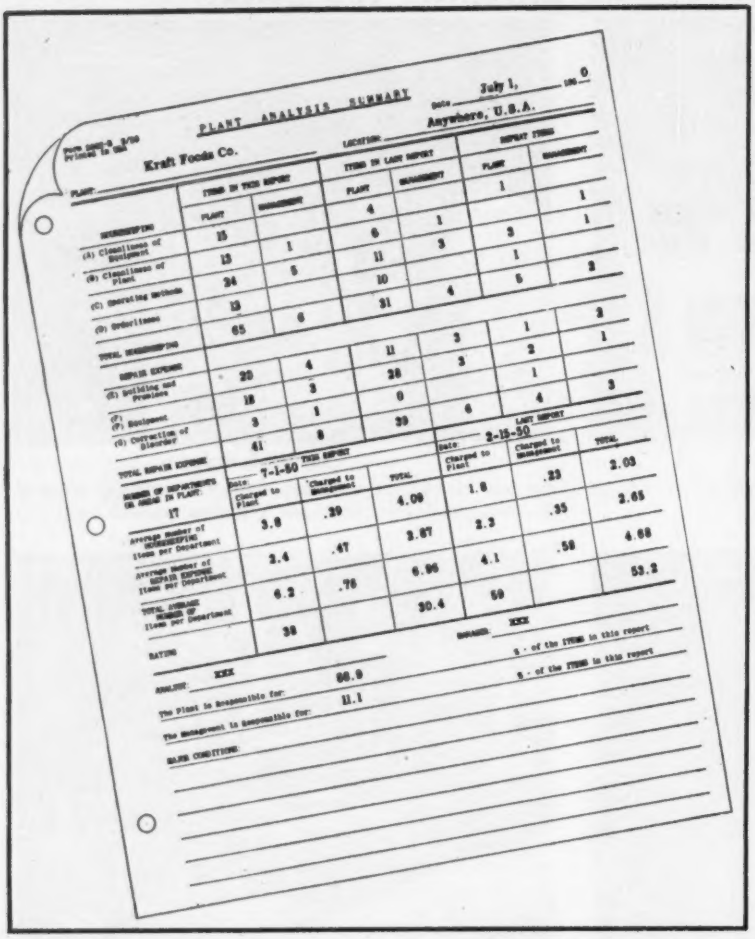
F. Making positive that clothes are never kept in processing areas or unneeded equipment left lying on work tables.

G. Maintaining floors as dry as possible and free from waste material.

H. Neatly arranging supply and utility cabinets.

The company does two things about equipment to score sanitation at par. First, it tees off by selecting food-contacting equipment that can be com-

Sheet for Keeping Tab



PLANT ANALYSIS SUMMARY

Date July 1, 19 50

Kraft Foods Co. Location: Anywhere, U.S.A.

	ITEMS IN THIS REPORT		ITEMS IN LAST REPORT		REPEAT ITEMS	
	PLANT	MANAGEMENT	PLANT	MANAGEMENT	PLANT	MANAGEMENT
(A) Cleanliness of Equipment	15		4		1	
(B) Cleanliness of Plant	13	1	6	1	1	1
(C) Operating Methods	24	5	11	3	3	1
(D) Orderliness	13		10		1	
TOTAL HOUSEKEEPING	65	6	31	4	6	2
REPAIR EXPENSE						
(E) Building and Premises	20	4	11	3	1	2
(F) Equipment	18	3	28	3	2	1
(G) Correction of Disorder	3	1	0		1	
TOTAL REPAIR EXPENSE	41	8	39	6	4	3

NUMBER OF DEPARTMENTS IN AREAS IN PLANT	17						
	Date 7-1-50 THIS REPORT			Date 2-15-50 LAST REPORT		
	Charged to Plant	Charged to Management	TOTAL	Charged to Plant	Charged to Management	TOTAL
Average Number of HOUSEKEEPING Items per Department	3.8	.39	4.09	1.8	.23	2.03
Average Number of REPAIR EXPENSE Items per Department	2.4	.47	2.87	2.3	.35	2.65
TOTAL AVERAGE NUMBER OF Items per Department	6.2	.76	6.96	4.1	.58	4.68
RATING	38		30.4	69		53.2

ANALYST: XXX BOARD: XXX

The Plant is Responsible for: 88.9 % of the ITEMS in this report

The Management is Responsible for: 11.1 % of the ITEMS in this report

RAIN CONDITIONS

TYPICAL plant-analysis summary sheet shows how housekeeping and repair-expense items are pinpointed and related in progressive perspective. Figures have been filled in to illustrate.

pletely dismantled—quickly and easily—and properly cleaned (daily after each use). Then it follows through with a scientifically planned equipment-clean-up program. Stress is on use of the right cleaning materials, used at proper concentrations, and at the suitable temperature.

Go through any Kraft plant and you will find equipment mounted on bases and supports built to facilitate cleaning and to prevent accumulation of foreign matter.

The equipment pieces with enclosed bases are mounted at least 6 in. off the floor. Also, machines are of stainless steel, designed to avoid accumulation of foods and to resist corrosion and discoloration.

In a typical Kraft processing plant, well-trained and supervised sanitary personnel is organized into day and night crews. The day crew polices general plant area, sweeps floors, and disposes waste materials. Night crew likewise polices areas, cleans processing rooms, disassembles and cleans equipment, and wash-sterilizes utensils.

8—CLEANING Stressed

Observing these clean-ups, one sees that the general procedure is to rinse equipment with water after each use, to fully dismantle all working parts and pipe lines, thoroughly wash machines inside and outside with Nylon bristle brushes, water-rinse, drain, and air dry.

Immediately before use, the equipment is flushed out with water and sterilized either by a 5 min. chlorine rinse (50 ppm. residual chlorine at end of rinse), chlorine spray (200-ppm. residual), a 5-min. hot-water rinse (170 deg. F.), or an organic sterilizing agent approved by research laboratory.

Water for rinsing, hand washing, and brushing is kept at 110-115 deg. F., supplemented by use of detergent and germicide for washing operation. Milk-stone removal requires 125-130 F. water for hand-washing of stainless steel and tinned surfaces, 160-F. water for soaking (followed by brushing), and 165-F. water for plate pasteurizers.

Wire wool or metal sponges never are used for cleaning equipment that comes in contact with foods.

Temperatures of cleaning solutions always are accurately maintained with automatic recording-controlling thermometers on storage and wash tanks.

Posted on bulletin boards in each production area are instructions on cleaning solutions and procedures—types and amounts of detergents and germicidal agents to use as well as temperatures of solutions.

Other equipment that does not come in contact with foods is constantly kept free from dust, water scale, oil, grease, slime, or soil of any type. Even equipment bases and supports show no signs of soil, grease, dust, or product spillage.

Water and storage tanks are systematically cleaned—inside and out. Inspecting and cleaning of these tanks is facilitated by easily accessible, well-constructed metal ladders.

9—PEST CONTROL Essential

Keeping insects and rodents out of plants is as important a part of sanitation as cleaning the plant and equipment.

As for insects, best method of control is to stop them from entering. This entails measures to eliminate all breeding places outside the plant—draining, filling, or DDT-spraying ponds and puddles of stagnant water. Helpful, also, is the practice of regularly disposing waste materials, and keeping waste containers clean and well covered.

Screening likewise is important. Screen wire (20- to 22-mesh) is kept in good repair, with no openings between windows and frames. Wherever electric screens are used, they are supplemented with 20- to 22-mesh screen to keep out smaller insects like gnats and mosquitoes. Properly fitted screen doors are provided with self-closing devices.

In addition, certain approved chemicals are employed to curb insects. Good practice is to sprinkle borax crystals around damp areas to kill insect larvae before they can hatch.

Qualified personnel treat wall and ceiling surfaces every three months with Dilan DDT (in deodorized kerosene) as a residual spray. Sprayed, too, are all cracks and crevices, electric motors, conduits, switch boxes, light fixtures, and other likely spots for insects to hide. DDT also is applied every three weeks outside the plant around doors, windows, whey tanks, and intakes.

COOPERATE with your bank. Failure to give full information may delay or lose your loan.

How To Make Bankers Say "Yes"

Practical pointers from accountants and banks to guide small food manufacturers in obtaining loans for seasonal expenses and expansion

This article was prepared specially for FE by Claire Trieb Slote, working in cooperation with American Institute of Accountants, national professional society of Certified Public Accountants.

WHAT SHOULD a small food manufacturer know about obtaining a bank loan? The most important thing is to know how the bank looks at both the application and at you, the applicant.

Banks which regularly deal with the food industry grow accustomed to a pattern of credit needs. They know, for example, that a processor of preserves buys his fruits at harvest time, and that his peak need for money is in the May-through-September period.

Similarly, they understand the effect on the food processor of the middleman's more varied, and cautious, inventory buying. The processor now incurs higher warehousing costs because he must store his production for longer periods.

Many other conditions peculiar to the food industry are recognized. But there also are conditions which apply alike to food and other industries.

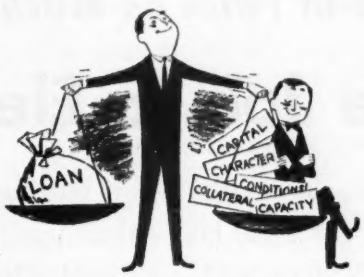
"When all is said and done," one loan officer declares, "the ultimate decisions really rest on what we think of the applicant himself." This all-important impression is actually a composite of the applicant's repayment records, references from his business associates and customers, and what the banker assesses to be his capacity for business success.

All-Important Five C's

These factors, *Character* and *Capacity*, are two of the "Five C's" traditionally used by banks to judge loans.

Capital comes next, assuming that the personal factors are satisfactory. Don't expect banks to supply the lion's share of the financial backing. A businessman should be prepared to back up his own confidence in his business by investing an amount in reasonable proportion to his debts. What is reasonable will, of course, vary considerably with the type of debt.

Collateral, bankers say, does not make a bad loan good, but may make a good loan better. Bankers do not want to foreclose, they just want repayment.



YOUR bank credit is weighed against your five C's: Do they balance the loan?

Conditions, the fifth "C," refers to general business conditions and to specific ones in the industry or locality which affect the applicant's financial prospects.

Put Best Foot Forward

Banks want dependable statements of your finances. Essentially, they want to see:

1. A balance sheet showing your assets, liabilities, and details of capital. You will probably be asked for comparative balance sheets for the past several years if you are applying to the bank for the first time.

2. A profit-and-loss (or income) statement, which includes such items as sales, costs of goods sold, salaries, rent, depreciation, utilities, supplies and miscellaneous income and expenses. It shows gross margins and net earnings.

In addition, you will be queried on such matters as: The aging of your receivables. The breakdown of your inventory, and your method of determining its value. Your contingent liabilities. And your reserve for taxes.

Danger Symptoms

Here are examples of situations which have obstructed loans to food companies:

Lack of planning: A canner decided to reach out for new markets, and he sent out his salesmen to visit several chains in cities where he had no outlets. The salesmen were successful. They placed a few impressive starter orders, got distributors interested in the line, and looked forward to distribution among smaller stores in the area.

But all this took time and money. It meant traveling with distributor salesmen, setting up floor displays, and so forth. Suddenly the canner found himself so strapped for cash that he had to rush to the bank for immediate help to meet his payroll.

This kind of panic does not set well with bankers. They naturally suspect some defect in your basic business thinking that leads to such last-minute crises. (*Turn to p. 256*)

IT'S WISE to have a CPA check the financial health of your business before you go for a bank loan.

Grain Arriving Here . . .

1 RECEIVING STATION, showing truck pit (covered center) and rail pit (right). Both feed same conveyor belts. Note rig for tilting trucks. Apparatus at right is rail-car unloading equipment. On platform (left) are . . .

You'll Check-In *Twice as Much* When You

Give the Job to Electronics

General Mills' Sperry plant shows it's so by putting through 3,100 bu. in the time formerly required for 1,700 bu. — thus upping the 6-hr. "take" to 18,000 bu.! . . . It's done with an "analog-to-digital" converter

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering"

New proof that electronics can do plenty to zoom material-receiving operations is offered by the modernized installation at the Los Angeles plant of the Sperry Division of General Mills, Inc.

▶ **Speed of grain receiving has been nearly doubled as a result of the advanced setup—still using the same basic equipment and with no increase in manpower.**

With the previous method, weighing-in of one carload took 56 min. But now, in that same 56 min., one carload *plus three truckloads* can be received—3,100 bu. as against the former, 1,700 bu.

So, instead of putting through 10,000-12,000 bu. in a 6-hr. day, the new system receives and weighs some 18,000 bu.!

When Sperry built the plant in '48, it made several innovations in grain-elevator design. It did away with the expensive superstructure, common to most elevators. In place of the traditional roofed "Texas floor" for grain distribution to headhouse bins (first accumulation point for incoming grain), it substituted enclosed Redler conveyors. Bins were left unroofed.

And instead of employing the conventional dump scales (which usually weigh about 120,000 lb. and require a large supporting structure), the company substituted two 5,000-lb. automatic scales (hopper models fully suspended and of lever-type). Reasoning was that the smaller scales would be less expensive to install and more flexible in operation.

Try and Try Again

As with any innovation, it has taken some time to get this one working to complete satisfaction. In the first installation, air-operated bucket valves, activated by an electric eye on the scale, were used to control intake and outgo of grain in the scale hoppers. But the electric eye controls were not accurate enough, and scale readings accordingly had to be taken visually.

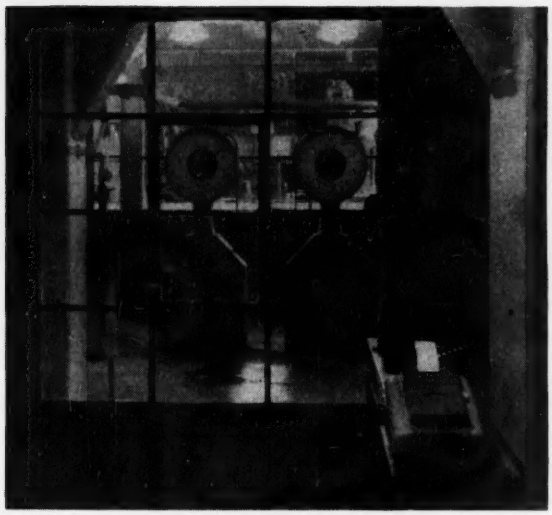
Next, Sperry tried a potentiometer attached to the scales. This instrument gave a graph reading of the weight, as well as controlling grain movement.

When the graph needle was at 0, it engaged a limit switch that closed the bottom valve of the scale hopper and opened the top to receive grain from the receiving pits. (Sperry has two receiving pits, one for rail cars, one for trucks, both feeding the same conveyor belts.)

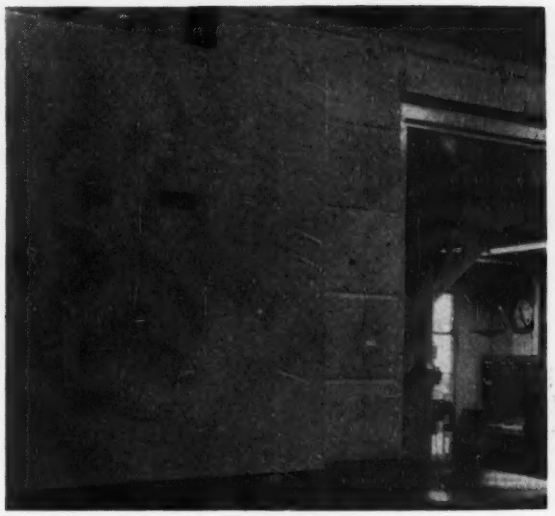
And when the needle moved to the 4500 mark, it engaged another limit switch, closed the top valve, and—after a time delay to allow accurate weighing of the grain—opened the bottom one to permit the grain to leave the hopper.

Accuracy of this installation was high. But there were mechanical troubles, such as the needle tearing the graph paper, wire breakage, etc. And there was considerable time loss in that the weighmaster had to "analyze" each load after the weighing—that is, convert the graphs to numerical readings and add the individual hopper

. . . Is Speedily "Brain"-Weighed



2 SCALES, seen here through window from weighmaster's office. After they record weights of hoppered grain, impulses are flashed to adding machine (right foreground) for automatic printing of figures. Panel on wall at right remotely controls headhouse bin chutes. And now, stepping into backroom, we come to the . . .



3 HEART OF THE SYSTEM—an electronic "analog-to-digital converter", known as the ETS-7 unit. Mounted within this wall cabinet, it remotely handles the control functions. Activation is via wire hookup with scales. Thus, respective valves on hoppers are closed and opened to admit and discharge grain.

weights to get complete load weight.

Company executives wanted something better, and they were sure they'd found it when they saw the automatic avocado-weighing installation at the packing plant of Calavo Growers of California, Los Angeles (FE, Apr. '53, p. 64). Accordingly, a call was put through to Industrial Electronic Engineers, North Hollywood, Calif., the firm that had designed the avocado installation.

Result is an automatic weighing operation that is accurate, swift, and minus any possibility of human error. Here are the details:

Basic in the installation is the ETS-7, an electronic "analog-to-digital converter" that performs related control functions.

Wire contacts on the scales activate the ETS-7 at 0 and 4500 lb. At 0 it closes the bottom valve on the scale hopper, opens the top. At 4500, it shuts the top valve, and–again after a brief (6 sec.) time delay to allow the scale to balance–it opens the bottom valve, allowing the grain to leave the hopper.

After the scale-balancing time delay, and before the bottom valve opens, the ETS-7 sends an impulse to an adapted adding machine, part of the system, which prints the exact weight on a standard adding-machine tape.

Both scales can be operated simultaneously, accepting grain from the same garner bin. But their operation can be independent. If one is shut down for maintenance, the other can still be used. The ETS-7 records their weights separately, and these weights are alphabetically designated on the tape according to which scale the weight represents.

The weighmaster does nothing during this operation, until the rail car or truck is emptied. The final hopper loads will be partial. When all the grain from the receiving pits has emptied into the scale hoppers, the weighmaster punches the "total" button on the adding machine. The machine prints the weights of the final loads in the two scales and adds them to the previous weights, giving a total for the whole load being received.

Having recorded the final weights, the ETS-7 releases the bottom gates on the hoppers. When the scales reach 0 again, the bottom valves close, the top ones open, and the system is ready for a new load.

Nothing in the weighmaster's job prevents the immediate unloading of another car or truck. As stated, there are two receiving pits, one for rail cars and one for trucks. If it is desirable to unload a truck even while car unloading is in progress, the car unloading may be interrupted.

This is done by taking a total of the weight already unloaded, changing valves by remote control, switching to the truck pit instead, and resuming the weighing operation. Later the car unloading may be resumed.

Simpler Technique

When the potentiometer was used, the weighmaster had to stop the weighing system after all the grain had moved through the scales, convert the graph readings into numerals, and total these with an adding machine to get the total for the load.

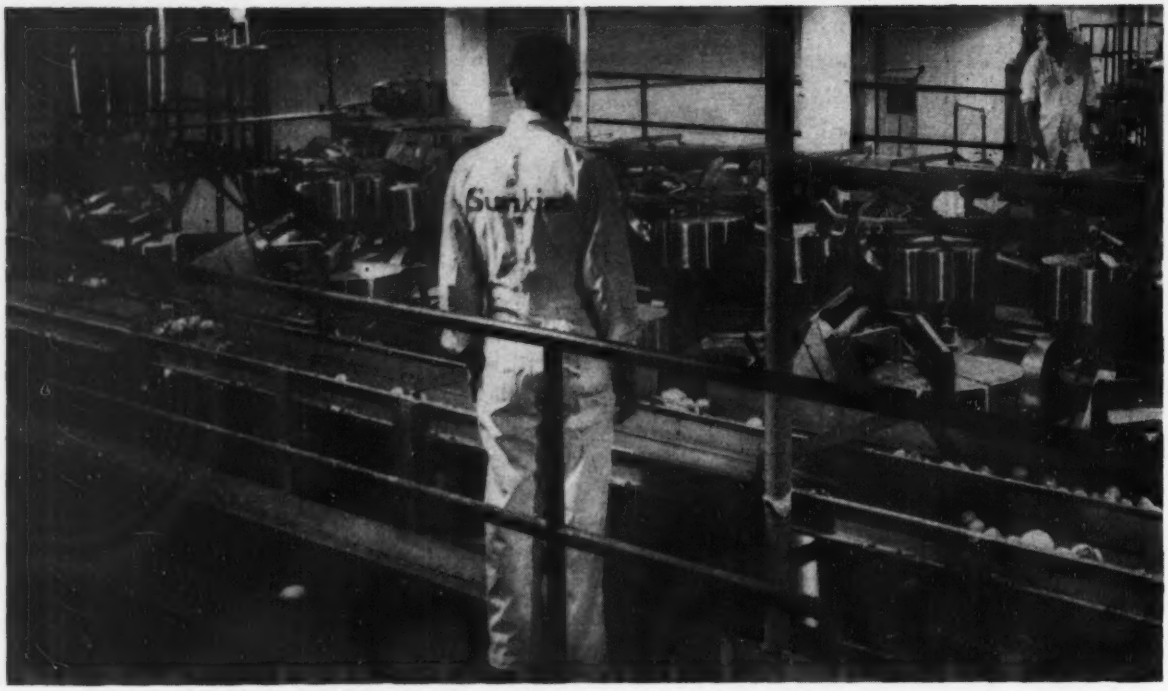
But with this new system he merely writes the total on the receipt, attaches the adding machine tape to the office copies, and sends them to accounting.

To take full advantage of the speedier weighing process, Sperry made other changes at the same time. Formerly there was a delay in operating the valves controlling air chutes from the Redler conveyor to headhouse bins, for these valves were hand-operated. When there was a shift from one bin to another–either for a new load or for a continuation of the same load–the system was shut-down while someone went up on the catwalk above the headhouse units to change the valves.

"By Pressing Buttons"

To eliminate this time loss, a remote control panel has been set up at the weighmaster's station. And now, simply by pressing buttons, the weighmaster activates air cylinders controlling the valve system and changes can be made immediately from one bin to another.

At the same time, the method of unloading trucks has been revised. The company had been using a power shovel with trucks on level ground. But by installing a truck dump that tips the truck back toward the pit, unloading time for a truck has been reduced from about 40 min. to 15-20 min.



PROPER LUBRICATION is something to conjure with when—as here—you have 33 extraction machines fed via five

Preventive *Lubing* Maintenance

Here are pointers on: Selection of lubricants, their characteristics, stock requirements, personnel needed, programming the work, value of charts and colors, and centralized servicing systems . . . Safety, too

R. C. SULLIVANT
Assistant Plant Engineer, Exchange Lemon Products Co., Corona, Calif.

For any modern plant, efficient lubrication is a decided "must." What's more, proper lubing requires a specific program, carefully planned and effectively executed.

And in plants processing foods, added factors come into play: The stringent sanitation operations–periodic steam cleaning, extensive use of water, and chlorine spraying–intensify the need for programming and diligent performance in lubrication.

Now add the use of chemicals in the production of such products as pectin, citric acid, lemon oil, and hot packed and frozen lemon juice products–and you get the picture of really complex lubrication problems at our company, Exchange Lemon Products Co., Corona, Calif.

Foremost poser is the corrosive action of the many chemicals used for example in processing pectin, hydrochloric and sulfurous acids are extensively applied. Second, there is the highly corrosive effect of lemon juice throughout the plant. Third, we cite the extreme wet condition due to frequent steam cleaning and continuous spraying of chlorinated water on all conveying equipment handling fresh fruit.

And finally there is the very low temperatures on the refrigeration equipment, freezing tunnels, Votators, large holding tanks, and in warehouses where the canned products are pre-cooled, frozen, and stored.

Choice of Lubricants Vital

To assure most effective lubrication under these conditions, wise selection of lubes is of utmost importance. The greases for regular bearings, as well as anti-friction bearings, must adhere to bearing surfaces to prevent moisture from entering . . . must not show signs of caking or cooking rancidity after long periods of service . . . must resist corrosion from acids . . . and should be suitable for easy handling in pressure guns or centralized pressure systems.

For sub-zero temperatures, the grease must remain soft and not separate under the extreme cold. Fluid lubricants, likewise, must resist corrosion and moisture, and should remain very stable and have a sufficiently low pour-point when applied to refrigerated equipment.

Our selection of the various lubes was made under the supervision of the plant engineer, whose responsibilities cover all maintenance and construction work performed under the general supervision of the chief engineer, valuable assistance was rendered by engineers of the oil company supplying the products.

The plant maintenance organization is of the centralized type and consists of craft departments. Direct lubrication duties are delegated to the supervisor of the machine and other metals shops. His direction extends

distribution conveyors. But Elpco's centralized pressure system does the trick.

Pays Handsomely

to the shift operational maintenance crews and also include the lubrication men.

It may be noted that there are two phases of lubrications which this department does not service: The electric shop personnel maintains and lubricates all electric motors, and the can closing equipment in the juice department is lubricated by the operative maintenance men.

Three Men Required

Although there are thousands of oiling and greasing points—all types of bearings, from anti-friction to babbitt and bronze bearings, and hundreds of gear boxes, open gears, and roller chains—three lubrication men accomplish the task. Two of them are scheduled for day duty, while the other man has a night assignment.

The night schedule is for the purpose of servicing equipment not available during the day hours, when the operations are continuous.

Another function of these men—an all important one—involves valuable inspection duty in the course of their work. Their daily routines take them to every nook and corner of the plant, giving them opportunity to check on many units. Reports are made daily.

Many serious shut-downs have been averted by the observations of these men, promptly followed by remedial measures as required.

We conducted a survey to map the most effective job of lubrication to cover the eight major buildings of the plant and multiple departments. Aim was to handle the job efficiently with the least man-power and minimum amount of time.

Our layout covers 10 acres. Here, walking is a time-consuming effort. And to minimize this waste, the types of lubricants were reduced to the least possible number that would properly do the work. Result was the saving of many hours that otherwise would have been consumed in going to and from the lubrication room to replenish the different lubes.

A large saving was made in room space in the lubrication room, and considerable money was also conserved by maintaining a smaller stock. Then we drafted lubrication charts showing every type of oil and grease and also detailing the equipment units where used. Every application was easily determined by a quick glance at the chart.

Next step taken was to determine the frequency of application necessary for the various types of bearings and units. This information was catalogued by departments. Finally, a rigid schedule for inspection and servicing was put into effect.

Color Code Saves Time

All enclosed gear cases and larger units with big reservoirs of oil or grease, thus not requiring attention for a number of months, are painted with a distinct stripe. And a capsule-type attachment is fastened on the unit with the recording date when last serviced. Then, color of the stripe is changed whenever the lubricant is renewed.

By this method, a visual check can be made of units that are not readily accessible, thus saving time and avoiding overlooking of any of the equipment.

There is a further safeguard to prevent duplication of work on vital equipment, and perhaps neglect of attention. This is the trick of keeping a check-off sheet in the lubrication room. On this sheet, each lubrication man enters his daily activity for the information of the others. A good communication system is thus maintained.

Regardless of how good a system is, however, it's not sufficient unless the proper tools and equipment are utilized.

Primarily, the lubrication room should be located in as central a spot as possible—with sufficient space to accommodate the various lubricants and the numerous applicators necessary to do an efficient job while eliminating all possible waste of time.

Since the lubricants must be free of any foreign matter, the location and surroundings must be as dust-free as possible.

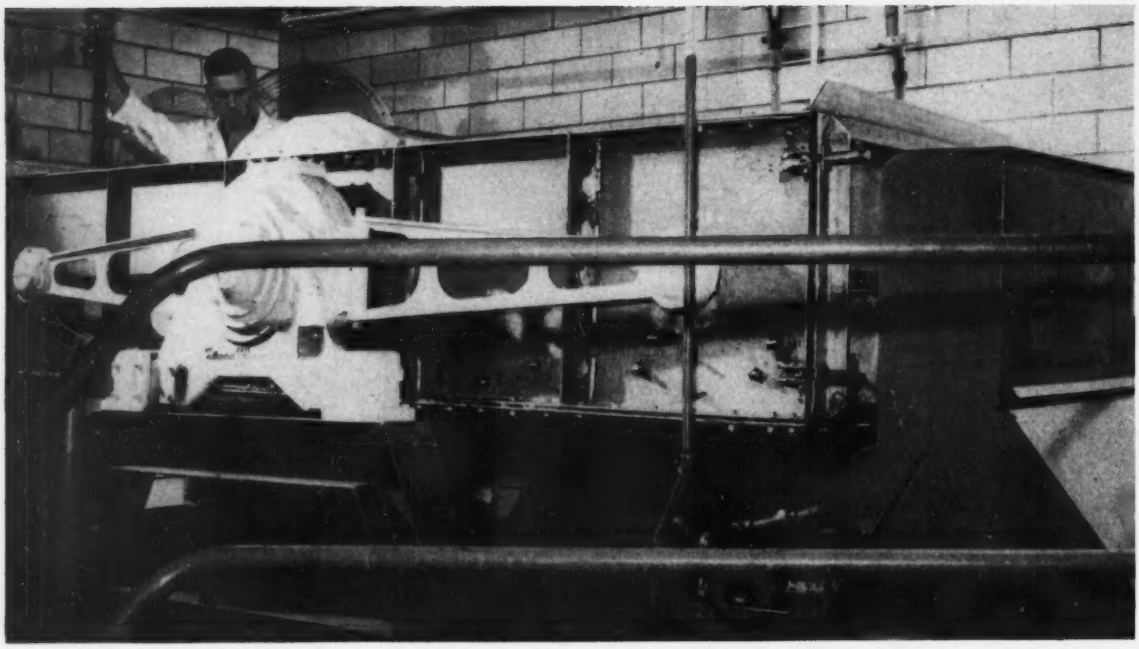
In addition to these conveniences and facilities, equipment in the plant should be made as accessible and convenient as possible to lubricate. Therefore, whenever feasible and practical, centralized pressure systems are highly desirable.

Centralized System Effective

One of our outstanding applications of the centralized pressure system, was on the fresh fruit handling equipment in the washing and grading and extraction departments.

Here, lemons are conveyed from storage bins to two separate lines of roller graders and brush washers—then sized. From the sizer, the fruit travels up inclined elevators to additional horizontal conveyors approximately 30-ft. high. This travel continues into the extraction room, where one long conveyor feeds five distributing lines

(Turn to page 211)



1 **PASSING OVER** vibrating screen, yeast aggregates are broken up and adhering resins and coagulated protein particles are removed from the yeast coming from fermenters. Schlitz plant is scene.

BREWER'S DRIED YEAST

Finds New Uses In Foods

Discovery of new properties increases what you can do with it . . . How it is processed explained here

ELSIE SINGRUEN and JOHN V. ZIEMBA

Respectively, Technical Director, Brewers Yeast Council, Inc., Chicago, and Associate Editor, "Food Engineering"

Research is finding significant new food-ingredient uses for the surplus yeast from beer fermentation–a yeast-multiplying process.

Some time ago, discovery of the high nutritive value of this yeast created a ready market for it as a nutritional supplement for animal feeds. But its introduction into human foods has been a slower development. Among the biggest initial users were those processing baby and infant foods. They appreciated it for its notable nutritive benefits.

Now, researchers have done more: Having proved the yeast's value nutrition-wise, they went on to demonstrate that it has certain physical properties beneficial in the production of many foods. And so its use in diversified food branches began to expand.

Major impetus was given to these developments during and after World War II, when much of the QM Food & Container Institute research and development work was concerned with the use of dried yeast in foods, resulting in its inclusion in specifications for crackers, canned bread, dry soup mixes, etc.

Following this work, further stimulus to research on food applications was occasioned by the discovery of natural antioxidant properties in brewer's dried yeast. This stride was made at the Southern Regional Research Laboratories under the sponsorship of the Brewers Yeast Council. And on the knowledge that the demand and applications of food-grade brewer's dried yeast are increasing, brewers are increasing facilities.

Typical are the additional yeast processing facilities recently installed at the Jos. Schlitz Brewing Co., Milwaukee, spelling the beginning of a dual-product operation–production of refined food grade brewer's dried yeast in addition to feed grade.

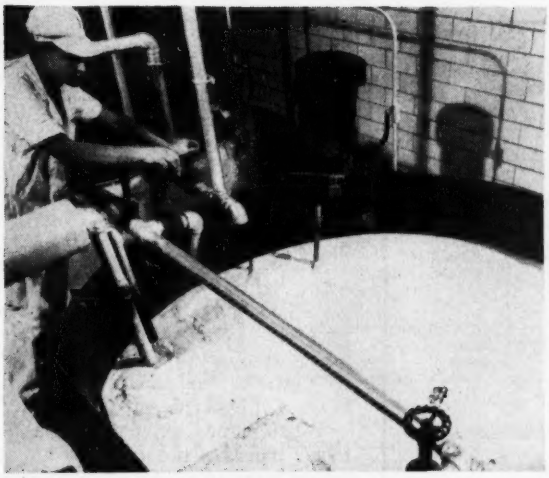
Annual output of the newly designed plant is estimated at about 3 million pounds, approximately 5% of which is refined for food uses. Remaining 95% is dried (as the surplus yeast comes from the fermenters) and goes into animal feeds.

Today, with installation of a second drum dryer, this brewer can simultaneously produce both grades of brewer's dried yeast.

About the Yeast

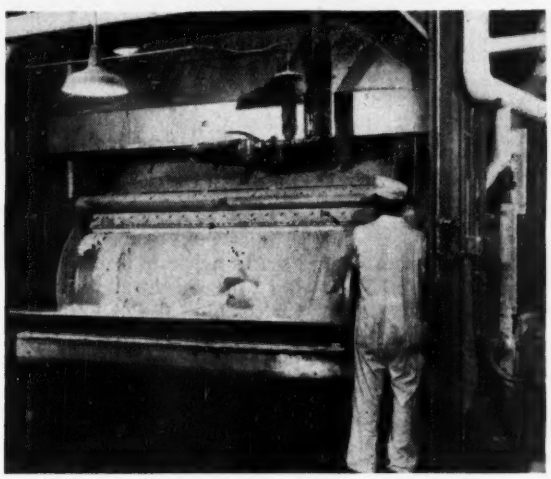
Brewer's yeasts belong to the genus *Saccharomyces cerevisiae*, with minor variations in individual properties attributable to species, type of beer from which derived, and manner of fermentation. Brewer's yeast differs fundamentally from all other types of yeast (including primary grown *Saccharomyces cerevisiae*) due to these facts:

1. It is the only yeast grown on an all-grain medium (beer wort made from



2 **YEAST** is refined for food uses by mild alkali wash under constant agitation, followed by water rinse.

3 **CENTRIFUGES** separate yeast from alkali solution and wash water during refining. Rate: 1,500 gph.



4 **DOUBLE-DRUM** unit continuously dries refined yeast to 6-7% moisture. Capacity: 375-400 lb./hr.

5 **PULVERIZED** dried yeast finally is packed in polyethylene-lined multi-wall paper bags.

malted barley, to which rice or corn have been added).

2. It is produced by bottom fermentation under anaerobic conditions.

3. It derives its nitrogen from natural sources—proteins and amino acids coming from the barley malt and modified by mashing to compounds assimilable by the yeast during fermentation.

Under these conditions, brewer's yeast develops a fermentation-enzyme system, as distinguished from the respiration-enzyme system of other types of yeast, grown under aerobic conditions on molasses, or other low-cost fermentable sugars, with the addition of ammonia or ammonium salts as the source of nitrogen.

Although yeast proteins of different origin appear similar in composition, there is evidence that they differ in nutritive value with the type of yeast and method of production. Moreover, it has been postulated that the content of certain unidentified factors may depend on these conditions.

What Goes On In Fermentation

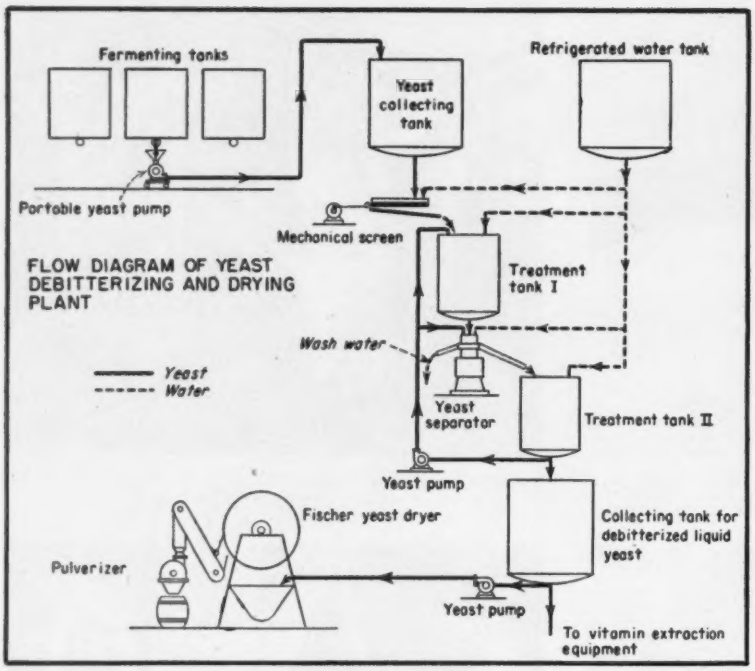
During malting and brewing, the starch in barley malt and its adjuncts is converted by amylolytic enzymes into fermentable sugars and dextrins. Barley proteins are modified, by proteolytic-enzyme action, to low molecular nitrogen compounds and free amino acids serving the yeast as nutrients and building blocks in the synthesis of its protein by direct assimilation.

During malting there are developed natural B-complex vitamins that dissolve into the beer wort during mashing. In fermentation the yeast absorbs practically all the thiamine from the wort and portions of the other B vitamins.

While fermenting, the yeast cells multiply by budding, resulting in a 4-5-fold increase of the yeast crop. It is this surplus of brewer's yeast that is recovered and dried or otherwise processed for utilization in feeds, foods, and pharmaceuticals.

All constituents of brewer's dried yeast are present in the natural form derived by biological synthesis from beer wort. Upon special request, brewer's yeast can be fortified to higher levels by the addition of synthetic vitamins. Proteins in brewer's dried yeast are practically completely assimilable by the human and animal body. Being complete proteins, they are of high biological value since they contain all the essential and most of the non-essential amino acids.

The dried yeast is also a good source of nutritionally important minerals, especially potassium, phosphates, iron, copper, and calcium. Its low sodium content makes it an important and suitable source of nutrients in certain types of dietetic foods. (Turn page)



HERE'S PROCESS LINE for good-grade brewer's dried yeast. It features advanced, stainless steel equipment for almost continuous output of A-1 product.

It contains all water-soluble vitamins of the B-complex, except B-12, and is particularly high in natural thiamine, riboflavin, niacin, pantothenic acid, and the less well-known components of the B-complex.

In addition, recent research has revealed several unidentified factors in brewer's dried yeast. One of these has tentatively been designated as Factor 3. Similar in function to vitamin E, brewer's dried yeast will prevent dietary liver necrosis in rats. Present studies of different types of yeast indicate that brewer's dried yeast is the only one containing this factor in appreciable amounts. Its importance in human metabolism must be established by further research.

For this purpose, a research fellowship at the National Institute of Health is maintained by the Brewer's Yeast Council, together with the Brewing Industries Research Institute. Research on the nature, multiplicity, and nutritional importance of the unidentified factors in brewer's dried yeast is being conducted at a number of universities and agricultural experiment stations under the sponsorship of the Brewers Yeast Council.

Some of the Yeast's Properties

Aside from its nutritive value, brewer's dried yeast possesses certain physical properties that make it a desirable ingredient in human foods. Its potent antioxidant activity is of great significance in foods of high animal fat content as a deterrent of peroxide formation as well as in the preservation of vitamins A, E, and D.

It is not yet known which constituents of brewer's yeast are to be credited for the antioxidant properties. But research aims to identify them.

Fact that non-debittered brewer's dried yeast possesses a higher antioxidant activity than the debittered may be an indication that debittering either removes some of the natural antioxidant or alters its effectiveness. However, sufficient antioxidant activity is retained in refined brewer's dried yeast for adequate protection, for extended periods, of such candies as butter mints, butter creams, and other foods of high butter content.

Brewer's dried yeast exerts a certain emulsifying effect in such products as dry soup mixes, in which it prevents separation of water from solids after boiling. Good results have also been recently reported with brewer's dried yeast when used in the new compound coatings for confections.

Dried yeast increases moisture retention when incorporated in bread, cake, doughnuts, and certain meat products. It is, however, not hygroscopic.

Today, baby and infant foods probably represent the major commercial use of brewer's dried yeast. Up to 3% is added for its nutritional value as well as for other physical properties.

As a source of nutrition, flavor, natural antioxidant, and other specific properties, brewer's dried yeast is now gaining new interest in the baking, confectionery, and meat branches.

Up to 2% brewer's dried yeast may be added, as an optional ingredient, to white bread—with the approval of FDA. If more is incorporated, the product must be labeled as a specialty bread.

Among the benefits are: Higher nutritive value, improved flavor (more homemade-like), increased moisture retention to prolong freshness, shorter mixing time, and better machinability by softening the gluten, particularly in cases of bucky doughs.

When added to doughnuts, the food's moisture and freshness are retained longer, while fat absorption and sogginess are curbed.

Up to 2% brewer's dried yeast in cake and prepared mixes also retains moisture in the baked product but, in addition, emphasizes flavor—particularly in the case of spice and chocolate cakes.

From 1½ to 2% brewer's dried yeast in crackers makes them crisp and flavorful. Too, its natural antioxidant retards rancidity development.

Brewer's dried yeast also improves the flavor of processed cheese. Further, it curbs rancidity in peanut butter. And when added at the rate of 2-3% in certain types of meat products, this yeast enhances the meaty flavor and reduces shrinkage.

Preparing the Food Grade

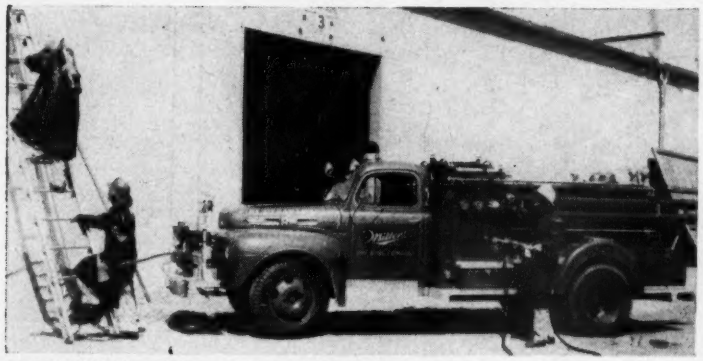
Processing surplus brewer's dried yeast for food use is essentially a three-step operation at Schlitz. Involved is removal of all adhering beer, hop resins, and coagulated protein; refining to a suitable blandness; and, finally, drying. Essential to production of quality dried yeast is the need to maintain processing temperatures between 32 and 35 F. during the first two operations.

Surplus yeast is pumped from fermenters to holding tanks in the form of a slurry containing 10-12% total solids (primarily yeast cells plus a small amount of hop resins, coagulated proteins, and small particles of hops). To break up yeast cell aggregates and remove all non-yeast matter, Schlitz pumps the slurry over a 200-mesh vibrating screen at the rate of 1,500 gph. Then the clean yeast, in uniform suspension, drops into a collection tank, from where it is diverted to any one of four 1,500-gal. stainless steel holding tanks.

From these tanks, slurry is pumped into four similar tanks where the refining process takes place. To remove

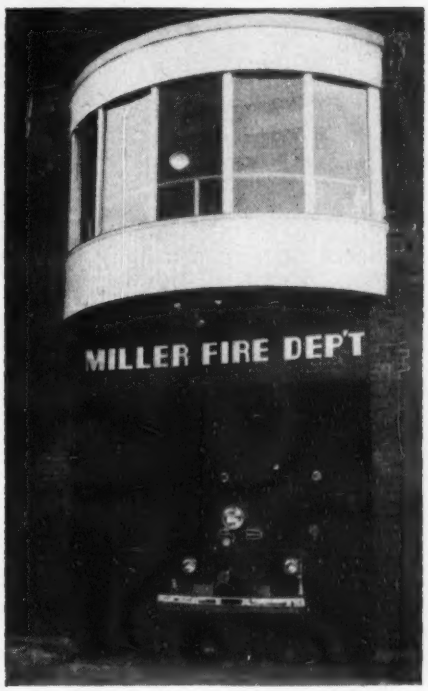
(*Turn to page* 238)

Brewer's Brigade Is Completely Self-Sufficient



SPANKING NEW fire truck is fully equipped with most advanced apparatus. Seen is drill involving ladder tactics.

TEAM demonstrates hose work. Street-flusher unit (right) "backs up" truck with 1,000 gal. of water in areas lacking hydrants.



FIREHOUSE (once grainery) accommodates guards on 2nd floor.

Fire Department—*For Your Plant?*

This case of a large brewery will help you weigh question. Cited are helpful "how-to-organize-and-equip-it" pointers

GEORGE CAROLAN
Fire Chief, Miller High Life Fire Department, Miller Brewing Co., Milwaukee

No matter how alert a company may be, fires can—and do—start. That's why we, at Miller Brewing Co., Milwaukee, have organized our own 36-man fire brigade. And it's fully equipped with the most advanced fire-fighting equipment—only exception is that we do not have a Dalmatian.

After organizing our fire department in 1952, our fire insurance premiums that year were reduced about 5%. Naturally, we still follow the practice, in the interest of safety, of calling the Milwaukee Fire Dept. whenever there's a blaze. However, thanks to our own department, we almost invariably have it under control before the city equipment arrives.

First Miller fire brigade was organized about 7 years ago through the cooperation of the chief engineer, director of safety, and traffic-department head. Facilities comprised a 2½-ton, converted-type fire truck, with a 100-gal-per-min. centrifugal pump, 800-gal. water tank, 200-ft. of 1-in. hose on a working reel, and a small group of firemen.

The brigade men did a good job. But one day something unexpected happened: They had just finished a street-flushing task when a fire broke out in a mill room then in the process of construction. By this time the water tank was empty. So we had to rely on our call to the city fire department. And by the time it arrived, the fire had caused about $2,000 damage.

That occurrence prompted us to reorganize our facilities into the present self-sufficient and more dependable department, which is immediately available for around-the-clock duties.

Reorganization was a three-fold venture. It involved setting up a 36-man 3-shift crew, installing more stationary fire-fighting facilities throughout buildings, and obtaining the best portable fire-fighting equipment available.

First was the matter of additional fire extinguishers. Where we had 25 before, now we have 300. Among them are CO_2, carbon tetrachloride, and dry chemical extinguishers, as well as water pumps. More fire hoses were obtained—increasing them from the original 200 ft. to a present 4,100 ft. All fire-hose couplings, too, were switched to standard thread so that

(*Turn to page 201*)

Everything but a . . .

BOTH product protection and visibility are ingeniously afforded by "Peek-a-Book" package. Shopper need only lift handy flap to view bacon. Then at home, guarding wrap of package unfolds at back for removal of slices.

From Passion to Patience

In Packaging

A View Through Management's Eyes

Costs must be countered, products better protected, and sales promoted—with a never-ending search for new techniques

FRANK A. HUNTER, JR.
President, Hunter Packing Co., E. St. Louis, Ill.

As a poor start to this discussion, I can say that meat packers should de-emphasize packaging, rather than push it—should suppress their desires as far as packaging is concerned.

How justify such a statement?

Well, the fact remains that packers' margins are very small, averaging only 1% on sales over a period of years. Livestock and labor take nearly 93% of the sales dollar. So obviously, there is little leeway left.

Over a period of many years, the consumer habitually spent about 6% of his disposable income for meat. Thus, the more packaging expense included in each pound of meat, the less pounds of meat sold.

On the other hand, meat competes with other foods for the consumer dollar, and only through effective packaging can the buyer's eye be attracted.

Moreover, meat is perishable and must be protected, so again packaging is important.

By no means do we yet have the perfect package. In the case of sliced bacon and sliced luncheon meats, light and air cause rapid discoloration and, as a consequence, the products quickly look old and unattractive. Cellophane, saran, Pliofilm, with or without vacuumizing, are not the perfect answer. But, as time goes on, new wrapping materials and techniques will solve our packaging needs.

Take Wieners and Bacon . . .

To be specific, let's review our efforts over the years to meet the challenge of packaging wieners and sliced bacon—two items you will now find in any self-service case.

About 25 years ago, wieners were simply pulled off the smoke stick (all linked together) and stuffed into a stockinette bag—a package with all the sales appeal of the old-time cracker barrel.

Perhaps it then became apparent that wieners so packaged were not very well protected during shipping. It was doubtful at that time if many packers were becoming aware of the more attractive packaging job being done by some competing food processors.

Now to the next packaging change—carton-packing of wieners. The carton was still an inferior package. It was

more expensive than the stockinette, and it required considerably more packaging labor. Wieners had to be cut apart and packed into the carton. Then the lid had to be put on and the box tied.

Up to about this stage, the wiener meat mixture was stuffed into sheep or hog casings. As the need for eye appeal became greater, the lack of uniformity (as to length and diameter of wieners in animal casings, prompted the Visking Corp. to produce a tubular cellulose material of exact diameter, into which the wiener meat was similarly stuffed as into an animal casing.

It then could be processed in the smokehouse and cook room and, when chilled, the casing could be peeled off. Resulting wiener was of a specific length and diameter and more uniform and eye appealing.

This innovation naturally led to a desire to identify one's product. Several means were used, such as stamping with vegetable ink, burn branding, or banding like a cigar (either each link or several links of batch). Finally came the Kartridge Pak, which improved uniformity, identification, and eye appeal over the previous two.

In this method, wieners are placed side by side in a grooved moving belt that carries them into a machine where they are continuously banded in any desired number.

This is still a good display package for service counters, but gradually it will become extinct with the continued growth of self-service.

With this rise of self-service, smaller units were required. Stores wrapped anywhere from 4 to 12 wieners in a package

(Turn to page 224)

6-Point Management Approach

These are Hunter Packing Co.'s head-office packaging tactics—

1. Be alert to new ideas.

2. Determine costs of packages, labor, and plant revisions.

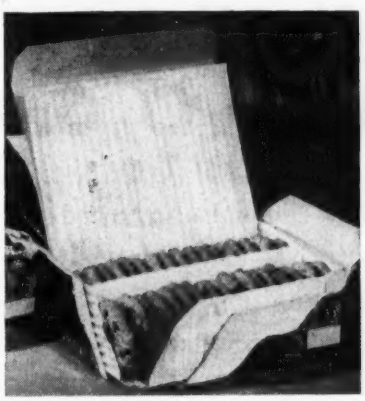
3. Ask these questions: Will additional packaging costs put the product at a disadvantage with the competition? What are the advertising and promotional appeals? Does the package protect the product? In just what ways is the package superior to the old one?

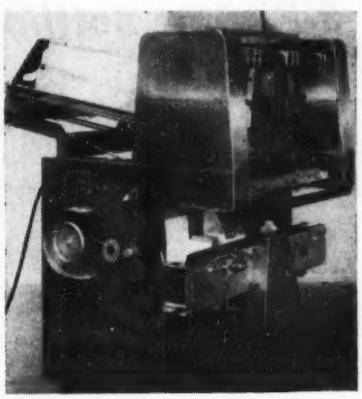
4. Keep an open mind until all possibilities of the package are exhausted.

5. Test the package in the stores to get consumer and retailer reaction before going overboard.

6. Go all out to promote, and sell—and stay with the package until some expert packaging people come up with a new, different, superior package that meets the tests and makes the old one obsolete.—*F.A.H.*

● ● ●





SHOCK-RESISTANT package with machine-inserted, floating corrugated liner (left) reduces cookie breakage. Right: Key unit in Weston's new package operation is this Korr-O-Liner machine that automatically sets up cartons and inserts liners at 60 a min.

Forms Cushioned Cartons At 60 Per Minute

Machine sets up carton and inserts floating corrugated liner which reduces cookie breakage. Labor saved

NEW PACKAGING METHODS are solving the problem of broken biscuits for Weston Biscuit Co. The company not only obtains 50% more protection for products in the carton, but reduces both labor and finished container costs.

Key tool for this improvement is a newly developed carton lining machine, the use of which was pioneered by Weston at its Burbank, Calif., plant.

This machine, the Kliklok Korr-O-Liner, automatically sets up trays or cartons, lines them accurately with greaseproof corrugated liners, and speeds them to the packaging line, ready for filling. No glue is required as the cartons, supplied by Container Corp. of America, have the Kliklok slot-and-locking-tab corner closure.

Though currently being used only for Weston's premium line of 10-oz. foil-wrapped cartons, interchangeable pre-set head and magazine assemblies are available for the machine to permit 10-min. changeovers to a wide range of other sizes.

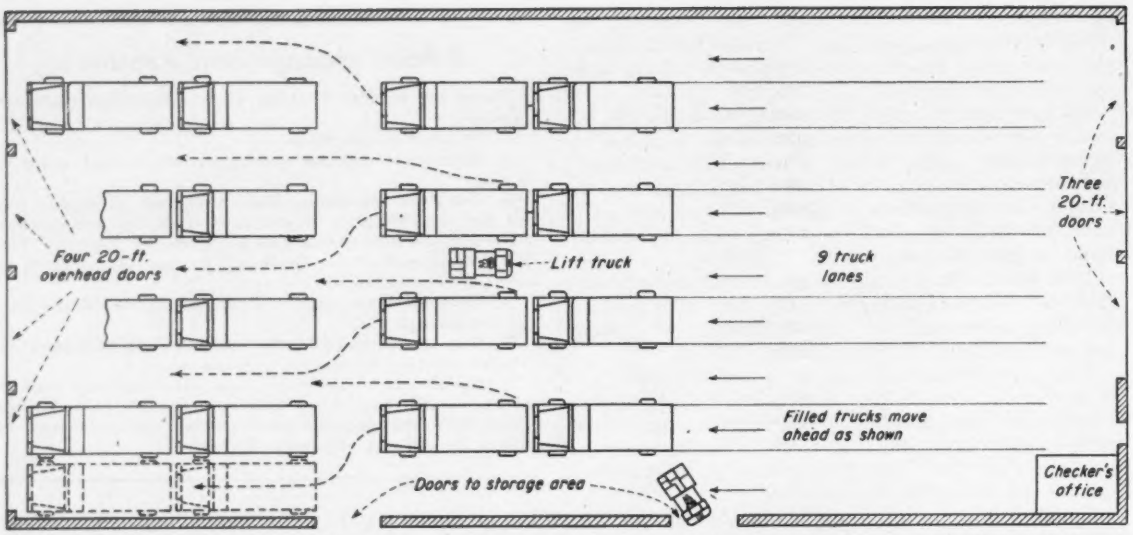
On the old packaging line, two girls worked full-time inserting liners by hand. Weston had found that machine-gluing—the alternative to the manual work—impaired their cushioning effect. Also, the liner flaps had to be held back by hand during filling, retarding the operation.

On Weston's new cushion-lining unit, one head sets up self-locking cartons at a rate of up to 60 per minute, while a second head automatically inserts pre-scored, corrugated liners.

These liners, supplied by Bemiss-Jason Corp., have single-top flaps which remain erect and out of the way during filling operations. This feature is credited by Heaton Goff, Burbank plant general manager, with greatly improving the packing line's efficiency.

Mr. Goff estimates that the new method frees the equivalent of 1½ workers for duty elsewhere. Only the occasional attention of one operator is necessary to replenish the machine's magazines, where formerly two operators were needed just to line the old cartons.

Liners for the cartons have their corrugations turned outward so that the packed product rests upon the smooth side. This, together with the liner's "free-floating" feature, absorbs external shock to cushion the product.



DRIVE-THROUGH GARAGE provides 30% more storage space. Returning trucks enter doors (right), are checked, then driven to loading stations (center and left), where pallets of empty bottles are removed and replaced with filled ones. Loaded trucks at center are then moved forward along dotted lines until they are abreast (as indicated by "ghost" trucks, lower left). Operation is repeated until area is filled.Four doors (left) enable trucks to depart without jockeying.

5-Feature Bottling Plant That's

BUILT TO GROW

Pepsi's Milwaukee facility combines advanced engineering, modern materials, and improved design to attain high-sanitation, low-cost operation . . . Special garage layout cuts truck loading and storage expenses

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

Described as the "most scientifically engineered bottling plant in the U. S.," the new 44,000-sq.-ft. Milwaukee Pepsi-Cola facility incorporates these five striking innovations—

1. Easy expansibility. Provision was made for doubling present capacity without any changes in the building.

2. Automatic bottling operations.

3. Pressurized syrup and bottling rooms supplied with filtered air.

4. Palletizing operations.

5. Improved truck loading and unloading that increases garage storage capacity approximately 50%.

The modern one-story brick and glass building is located on a 74,000 sq. ft. site that provides ample room for parking of trucks and cars.

Windows are of ⅛-in. heat absorbing, glare resisting Coolite glass. Frames are of aluminum bar construction with projecting ventilators at the tops. Roof is of precast concrete plank with 2 in. insulating-board covering and built-up roofing.

Walls of syrup and bottling rooms are 8x16 in. ceramic glazed structural tile. Floors are of 6x6x1⅛ in. red quarry tile with non-slip Emeritread surfaces. Ceilings are of 12x12x¾ in. Fiberglas Sonofaced acoustical tile. In addition to its sound absorbing properties, the plastic coating on the face of the material enables washing without damage to the tile. This latter feature is particularly important in the processing rooms exposed to syrupy products.

Planned for Future

Allowance was made for expansion of production capacity by providing space in the syrup room for installation of additional mixing and storage tanks. And a second bottling room was built alongside the present one. By installing necessary equipment in these rooms, present capacity easily can be doubled.

To eliminate possibilities of product contamination with yeast and molds, all air entering the syrup and bottling rooms is filtered. And it is supplied in sufficient volume to maintain a pressure within the rooms that prevents entrance of air from other parts of the plant.

Air is drawn in via a duct in the roof and passes through the filtering and distribution system mounted above ceiling of bottling room. It enters processing rooms through ceiling outlets near outside wall of building (see accompanying drawing).

Automatic Bottling

Operations in bottling room are almost completely automatic. Cases of empty bottles are removed from pallets and placed on a conveyor in the warehouse area. This carrier moves the cases to the feed end of the 24-wide, pint-size Meyer washer where a Dumore uncaser lifts out the empties and places them on the washer feed

table. Cases continue on the conveyor to the automatic case packer.

Clean bottles are discharged from opposite end of washer in bottling room and conveyed to the 50-spout (260 bpm.) Meyer filler. Then comes crowning, after which conveyor line divides to feed filled bottles to two 150 bpm. RCA electronic inspectors that automatically reject bottles containing foreign matter.

These units, originally developed for clear bottles, were completely redesigned to overcome interference from the "color-applied" bottle labels used by this company.

Following inspection, filled bottles move to the 4-lane Standard-Knapp automatic packer, where they go into cases fed from the Dumore uncaser, then are conveyed to the warehouse area for palletizing. Other modern units in the bottling room include a Meyer deaerator and synchrometer, and a Mojonnier carbo-cooler.

A special feature of the pallet loading and unloading operation is location of the empty bottle conveyor directly above the one that brings filled cases from the bottling room.

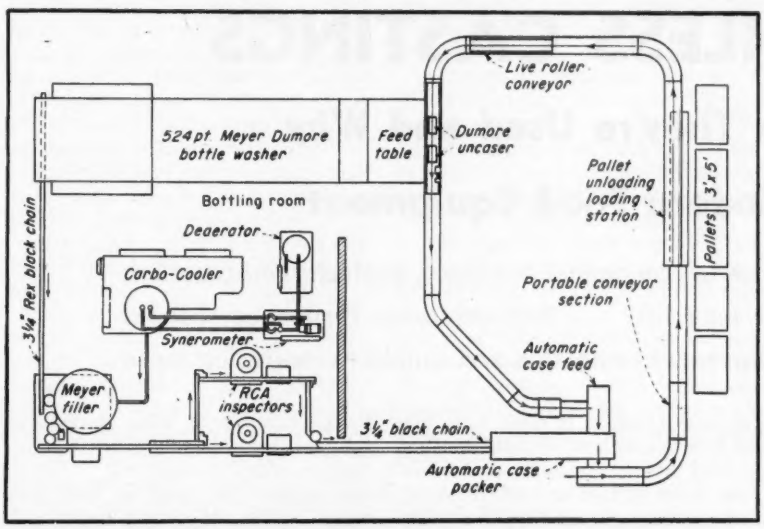
This arrangement brings the following two benefits: (1) It eliminates moving of empty pallets from a position beside the washer feed conveyor to the filled bottle case conveyor, and (2) it saves floor space as compared with the conventional layout (see accompanying drawing).

Space is provided beside the conveyors for placement of five 36x60 in. pallets, brought from storage area by fork trucks. These cases are transferred to the upper conveyor. Then cases of filled bottles are removed from the lower conveyor and stacked on the empty pallets. In this way, fork trucks bringing loads of empties from storage area take filled pallets back on the return trip.

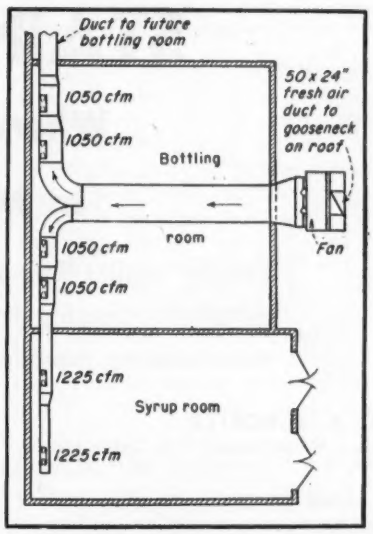
Space Saving Garage

Separated from the plant and warehouse area by a solid firewall, yet a part of the new facility, is the 85x200 ft. garage, designed especially for palletized handling. (Turn to page 254)

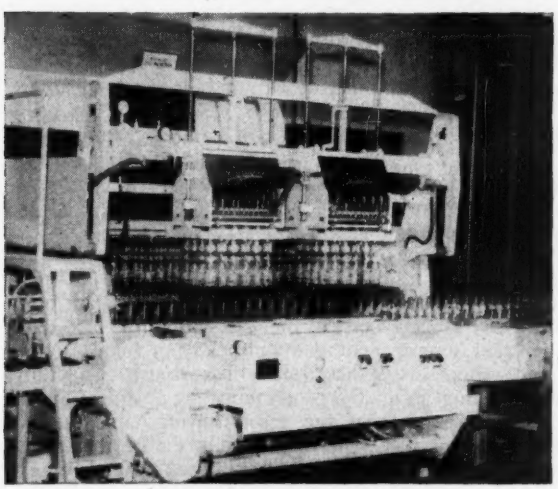
These Features Cut Costs and Improve Sanitation



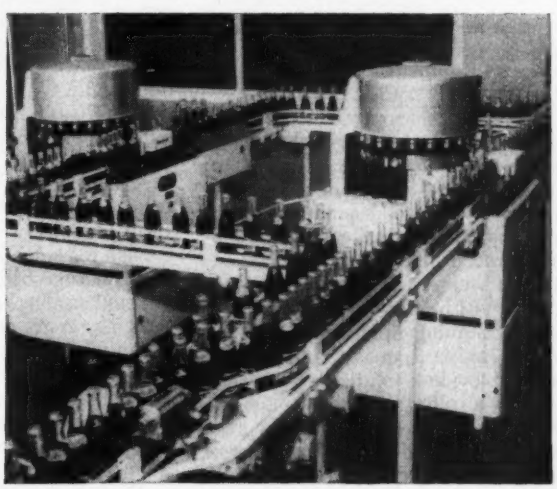
AUTOMATIC high-speed equipment plus careful placement minimizes labor in bottling room. Conveyor picks up cases of empties at pallet station (right), returns cases of filled bottles for palletizing at same point. Portable conveyor section enables fork-truck to deliver new bottles to washer.



BACTERIA-FREE product is assured by pressurizing syrup and bottling rooms with filtered fresh air distributed by ducts above ceiling.

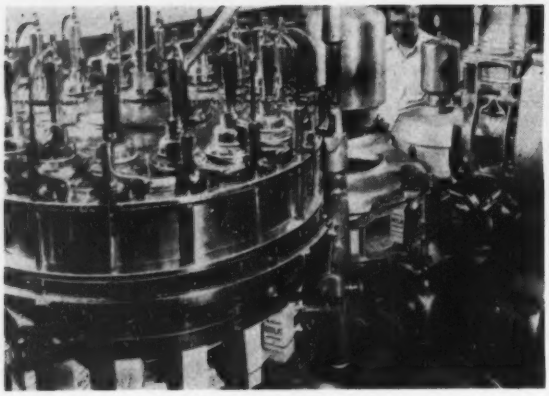


UNCASER automatically removes empty bottles from "shells", sets them on feed table of huge washer.

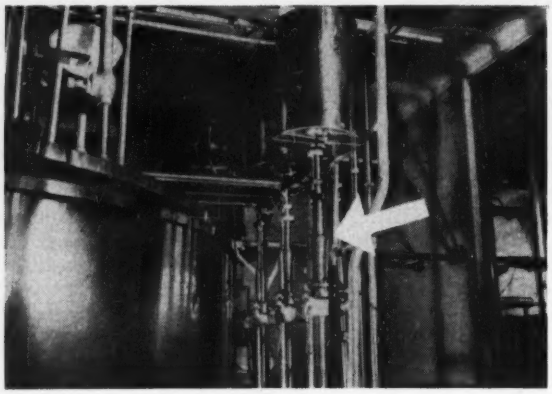


FILLED bottles are inspected electronically as they pass "eyes" that reject ones with extraneous matter.

Versatile Cast Alloys Provide Ultra-Smooth



FILLER



METER

STAINLESS CASTINGS

Where They're Used and *Why* In Modern Food Equipment

Survey credits their rise to economical one-piece, sanitary construction, durability making for long life. . . And corrosion resistance reduces maintenance, provides product protection and simplifies sanitation tasks

E. A. SCHOEFER
Executive Vice-President, Alloy Casting Institute, Mineola, N. Y.

Food processors are today making increasing use of stainless castings in processing equipment, according to a recent broad survey by the Alloy Casting Institute, Mineola, N. Y.

These castings offer the advantages of corrosion resistance and economical one-piece construction. Increased life and lower maintenance costs of cast stainless components mean tangible savings to the equipment user.

Modern, mass-production equipment must meet the critical demands of processors for maintaining quality, uniform flavor, and freedom from contamination in food products. Strict compliance with current local, state, and federal health regulations poses the further problem that the equipment must be capable of withstanding severe cleaning operations. The corrosion resistant qualities of stainless alloys provide a solution.

Only a comparatively few years ago, food processing equipment was made of tinned or galvanized carbon steel, also tinned bronze. In many cases, this led to a serious type of contamination in food products—metallic contamination. Even minute amounts of metal, such as iron, zinc, and copper, may destroy vitamin or nutritional values, discolor the product, or undesirably affect its flavor.

Cleaning these coated metals with hot water, steam, and strong chemicals, as well as mechanical brushing, attacked the coatings and increased the danger of copper and iron destroying the vitamin C content of many foods, such as citrus juices. These metals also impaired the flavor of milk and other dairy products.

Although most foods are not highly corrosive, the development of even small amounts of corrosive products is enough to contaminate and change the flavor of large batches of foods.

Stainless alloys do not affect the appearance, taste, or nutritional properties of food. They are resistant to most cleaning chemicals, hot water, live steam, and mechanical brushing and scouring. The finish of stainless equipment is permanent and does not require repolishing.

The danger of bacterial growth caused by decay of organic food particles increases as food processing equipment and handling mechanisms become more complicated. "Nooks and cranies" are traps for food particles. Other important sources of bacterial decay are surface imperfections caused by chipping or cracking of coatings. Minute particles of food trapped in this way may resist the most rigorous cleaning measures.

Thus, in addition to having good corrosion-resistance, the equipment construction materials should be homogeneous, and possess a good surface finish. These requirements are being met by use of stainless castings, combined with streamlined design for ease of cleaning and avoidance of traps.

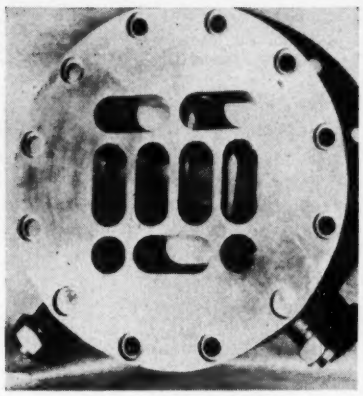
Five Types Used

From the group of alloys offering a wide range of corrosion-resistant properties, the cast austenitic or "18-8" chromium-nickel types frequently are chosen for their strength, ductility, and good fabricating qualities. Shown in the accompanying table are five types, identified by the Institute's symbols, commonly used in food processing equipment.

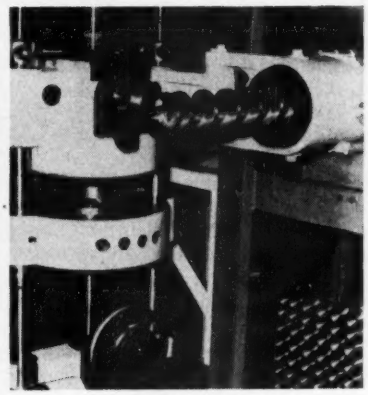
The general-purpose CF-8 and

(Photo credits: Filler, American Can Co.; meter, Fischer & Porter Co.; screwpress, DeFrancisci Mach. Corp.; disintegrator, Rietz Mfg. Co.)

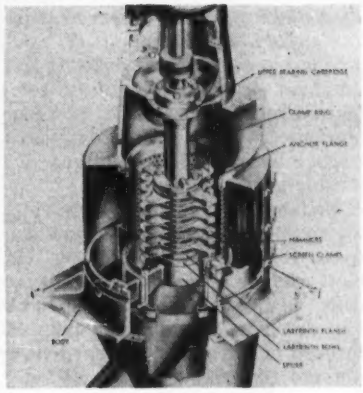
Sanitary Surfaces That Can "Take-It" in Your—



HEAT EXCHANGER



SCREWPRESS



DISINTEGRATOR

CF-20 alloys are resistant to acid media that are strongly oxidizing. Both weak and strong alkaline solutions also are resisted by these grades. Addition of molybdenum to the alloy, as in the CF-8M and CF-12M types, improves resistance to reducing media and various salts. Where extensive machining is required, the selenium-containing CF-16F grade is often used.

Here's how these alloys are employed in specific applications in the food industry:

One of the first food processors to replace coated metals with stainless was the dairy operator. Cleanliness is a major requisite in processing dairy products. Most milk handling equipment is taken apart after each run—a minimum of once a day—and is cleaned with water, steam, various detergents, and at least one sterilizing compound, such as sodium hypochlorite. Cleaning and sterilizing are easier and more complete with stainless equipment, since it permits use of stronger solutions.

Used in Filler

Stainless is used extensively in the construction (by American Can Co.) of fully automatic paper-packaging equipment for fresh milk. It is considered especially necessary for the filling units, which come in contact with the milk being packaged.

One of the most important parts of such a machine is a cast stainless "milk tank", a large collecting bowl for the milk prior to the actual filling operation. The stainless casting has a depth of 14½ in. and an overall diameter of 45¾ in., and it weighs about 450 lb. after machining.

Length of service life is an important factor in the selection of a cast stainless alloy. The ease of cleaning is another factor in its choice—and the streamlined, "domed" shape of the bottom inside surface is an aid in this respect.

Although all of the cast alloys listed in the chart have the required corrosion resistance, Type CF-16F, the free machining grade, was chosen because several machining operations, including milling, turning, drilling, and boring, are performed on the bowl.

Another cast stainless part in the filling machine is a measuring valve bracket. This bracket, welded to rods that fit into the periphery of the milk bowl, is cast of Type CF-16F alloy because of the complex shape of the unit and the machining required. Stainless was specified because of the contact with severe cleaning chemicals at elevated temperatures.

Role in Meters

Uniformity of product, which depends on close control of the various ingredients to be mixed, is of utmost importance in successful production of ice cream. To accomplish this and to maintain purity and flavor by preventing contamination, ice cream producers, such as Abbott Dairies of Philadelphia, use all-stainless sanitary-type Flowrators (Fisher & Porter Co.) These meters transmit flow rate electrically to a remote ratio controller that automatically maintains preset proportions of the ingredients for the ice cream mix.

Body of the meter is of a high alloy casting—usually CF-16F for improved machinability, although other types of cast stainless, such as CF-8, or CF-8M, are also used in this service. The tapered inside of this casting forms the metering tube section of the meter. The stud bolts are screwed into the flange and then silver-soldered in place. The lower section, including the union, is a standard cast stainless unit. Here, ease of cleaning as well as prevention of flavor contamination are the important factors in the choice of a stainless casting.

Place in Heat Exchanger

The elevated temperatures of preheating and other dairy processing operations, such as pasteurization, increase the danger of corrosion and contamination. Cast stainless alloys often are employed in the construction of heat exchangers for this field. A typical example is a 150-lb, 24-in. dia. heat exchanger head made of Type CF-20 cast stainless.

The corrosion element in milk primarily is lactic acid. However, the same type of heat exchanger head is used in processing fruit juices and

STANDARD DESIGNATIONS and Chemical-Composition Ranges for Cast Corrosion-Resistant 18-8 Alloys.

Cast Alloy Designation	Wrought Alloy Type*	Composition—Percent (Balance Fe) C Max.	Mn Max.	Si Max.	P Max.	S Max.	Cr Min.-Max.	Ni Min.-Max.	Other Elements
CF-8.....	304	0.08	1.50	2.00	0.04	0.04	18–21	8–11	.....
CF-20.....	302	0.20	1.50	2.00	0.04	0.04	18–21	8–11	.....
CF-8M.....	316	0.08	1.50	1.50	0.04	0.04	18–21	9–12	Mo 2.0–3.0
CF-12M....	316	0.12	1.50	1.50	0.04	0.04	18–21	9–12	Mo 2.0–3.0
CF-16F....	303	0.16	1.50	2.00	0.17	0.04	18–21	9–12	Mo 1.5 max., Se 0.20–0.35

* Wrought-alloy type numbers are listed only for convenience of those wishing to determine corresponding wrought and cast grades. Because cast alloy chemical composition ranges *are not the same* as wrought composition ranges, buyers should use cast-alloy designations for proper identification of castings.

tomatoes, where such acids as citric, acetic, and malic must be handled. Changing from nickel-copper to stainless avoids contamination of food products at elevated temperatures and simplifies cleaning with caustic solutions. Type CF-20 provides excellent resistance to these food acids as well as good mechanical strength and reasonably good machinability.

No broad standards have been set up for equipment construction and materials for fruit juice processing, but most operators conform closely to the dairy field standards. Strong alkaline detergent solutions are pumped through piping and equipment following use to remove organic deposits. In general, all equipment is designed so that it is readily accessible for cleaning.

Materials that destroy the vitamin C in fruit juice are being eliminated from processing equipment. Molybdenum-containing cast alloys CF-8M and CF-12M are used because of their excellent resistance to organic acids, as well as to cleaning chemicals.

Hollow Extractor Screw

In the pineapple field ordinary carbon steel rapidly is corroded by the acid in the fruit. Then, too, some situations involve not only corrosion, but also abrasion, as encountered in the operation of an extractor screw. To meet these conditions, one of the machines empoys a screw made of Type CF-12M alloy. It is 6 ft. long and weighs 1,000 lb.

In operation, the screw turns about 5 rpm. and ground pineapple skins are introduced through a housing at the small end. While traveling along the screw, juice that is pressed from the mash passes out through a cylindrical screen and also through the walls of the screw, to be drained at the end.

An interesting example of the application of modern methods to food processing is the growing use of continuous presses and automatic mixers to replace batch processes in the production of mixed cereal products, such as macaroni.

Extrudes Dough

In the continuous-automatic macaroni press (DeFrancisci Machine Corp.) pre-measured quantities of floor and water automatically are ladled from hopper into mixing

(*Turn to page 212*)

● ● ●

Vacuum Waste Unit Reduces Down-Time

Zips casings and strings from six frankfurter skinners continuously, avoiding loss of 8 machine-hours daily

BY PUTTING AIR TO WORK, the R. R. Pressel Sausage Co., Detroit, has disposed of a disposal problem. Pressel uses a stream of air from a central vacuum system to carry waste material to a central point for incineration. This material comprises the process casings and tie strings removed from skinless franfurters and sausages by a battery of six skinning machines.

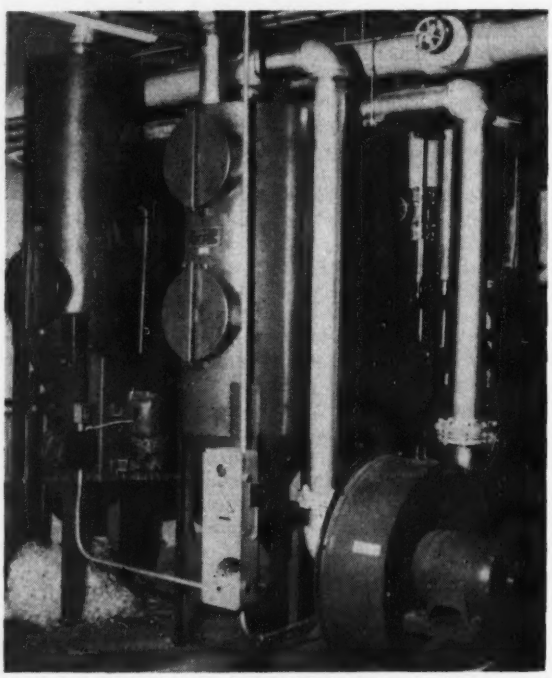
This job of disposing of the 12 bu. of discarded casings and strings each hour created some expensive production problems. At one time the waste was collected in a stainless steel drum located at each machine. And each machine had a small individual vacuum system to suck the wet, cellophane casings into the drum.

But with that arrangement, each peeling machine had to shut down for 5 min. every half hour while the collecting drum was emptied. So on an 8-hr. shift, 1½ hr. of production time was lost on *each machine*. Which meant that six machines were needed to do the work of five.

In addition, it was a full-time job for one man to empty the machines.

This being an unsatisfactory situation, Pressel asked Lamson Corp. if it could adapt a pneumatic conveying system to the operation.

This was done. And the system consists of a centrifugal exhauster which creates the vacuum, a primary and a secondary separator, and 2½-in. pipelines connected to the peeling machines. A constant vacuum draws casings and strings from the peelers, through the pipelines, into a manifold that feeds the primary separator. The bulk of the casings are collected in this separator; the remainder in the secondary separator.

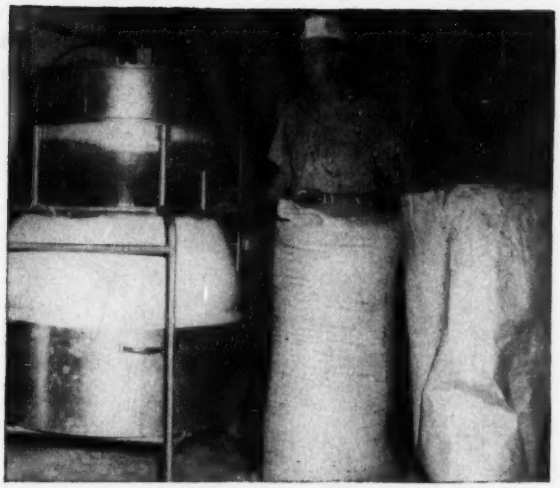


WASTE CASINGS AND STRINGS from frank skinners are sucked up by vacuum created by blower (right). Two separators (left) take waste from air and discharge it.

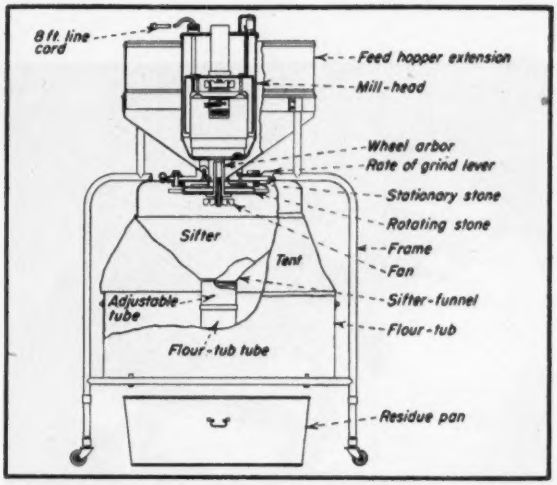
The air is filtered through the secondary unit and returned to the production area. The casings are emptied through a rotary discharger at the bottom of the primary separator and disposed of in a nearby incinerator.

Thus, the casings and strings make the trip from the peeling machines to a convenient collecting point 100 ft. away with no manual handling. And they are collected in a large tank which may be emptied at any time without interfering with production.

It is no longer necessary to shut down every machine 10 min. out of every hour to remove the casings. And sanitation is simplified. And one man is available for more productive work.



ENTIRE wheat berry, including bran and germ, is stone-ground by mill at Gardner firm's Janesville, Wis., branch. Rate is 60 lb./hr. Flour immediately is used in conventional way to make "old fashioned" breads.



DETAILS of new portable mill. It's readily adjusted for different degrees of grind. Soft wheat germ is retained in flour, and bran is reduced to small particles that aren't irritating.

Whole Wheat Ground "On the Spot" By Portable Stone Mill

With it Wisconsin baker avoids germ oxidation by producing flour daily for 2,000 loaves

FE STAFF

Because of the rising tide of interest among commercial bakers in the production of tasty, nutritious whole wheat bread, considerable attention is being directed to the portable stone mill installed by Colvin Bakery, Janesville, Wis.—a branch of Gardner Baking Co., Madison.

This mill solves the problem of oxidative deterioration of flour containing the wheat germ because the bakery grinds the flour daily as needed. The mill will grind the entire wheat berry—including bran and germ—to an extremely fine flour without overheating. In this product, the bran particles are sufficiently small that they are not irritating.

Developed by Lee Engineering Co., Milwaukee, the mill used by Colvin grinds the wheat between a rotating and a stationary stones made of carborundum, second only to the diamond in hardness. Special grooves (see illustrations) are molded into the stones to avoid crushing the wheat during grinding. The average life of these stones is 60 tons of wheat, and dressing is unnecessary.

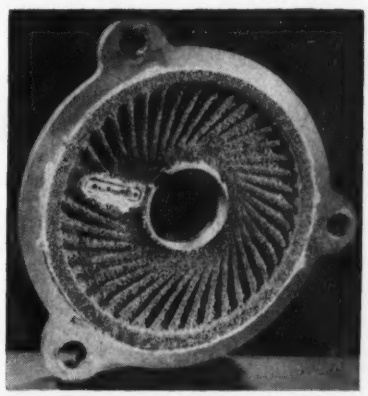
The new mill will grind a 100% whole grain flour. Or it will grind and sift, at the same time, the coarser bran from the flour, if a cream-colored flour is desired.

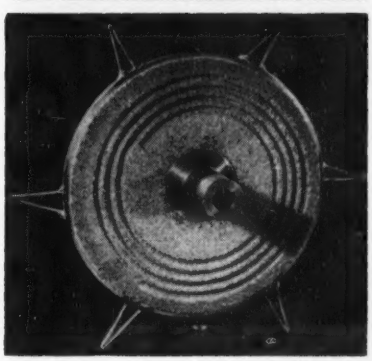
Mill is equipped with three index stations for positioning the stationary stone so as to provide for different degrees of grind. Gap openings, set between rotating and stationary stones by a calibrated dial, range 0.006-0.070 in. And they can be adjusted in a matter of minutes for easy switching from very fine to coarse flour or to cracked grain.

A rate-of-grind lever determines the amount of wheat kernels entering the grinding chamber. Moving the lever to the left decreases the load on the motor, while moving it to the right increases it. Motor load also varies with type of wheat. Soft wheat, for example, requires less power to grind than hard wheat. A thermal overload device is employed to safeguard the motor.

Load and current draw of the motor are determined by the amount of whole wheat grain fed into the grinding chamber. Therefore, a meter has been installed on top of the mill to indicate work load. Right section of the meter face is red-inked. Meter

(Turn to page 256)

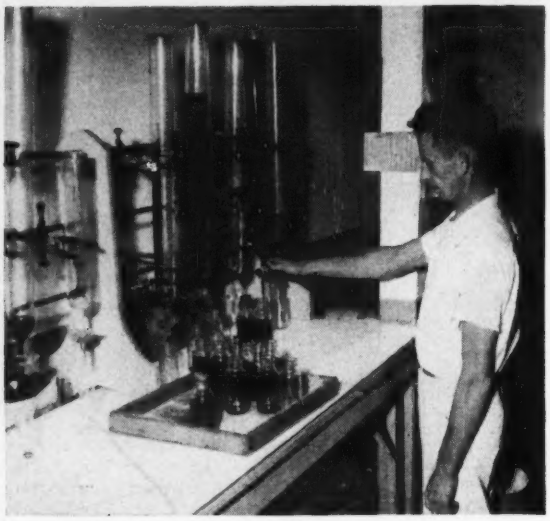




STONES are made of carborundum and are designed to prevent crushing of berries. Top: Stationary stone. Above: Rotating stone.

Uniformity Is Given

SMOOTHNESS of 'mallows is assured by gaging size of sugar crystals with a micrometer.



BY MEASURING colors and flavors in lab, uniformity is maintained in each hued, flavored batch.

Winning A-1 Quality

With a *High-Output Low-Cost* Process Line

By eagle-eyeing all his operation steps, confectioner finds shortest way to get products that are longest on taste appeal . . . Mixing, forming, packaging improved

E. DALTON WHITE
FE Correspondent, Atlanta, Ga.

Brock Candy Co., Chattanooga, Tenn., lavishes as much attention on attaining uniform-quality marshmallows as it does on increasing output and slashing production costs.

In fact, it has shaped the latter to win the former.

To line up the most practical tactics for attaining this triple goal, the firm put extra emphasis on re-evaluation and revision of its entire 'mallow operations.

▶ **Outcome was adoption of (1) advanced quality-safeguarding practices, (2) a continuous process, and (3) a newly designed packaging system.**

As for quality, first step entailed repeated testing leading to development of a formula for making a firm, tasty marshmallow having long shelf life.

Moisture vs. Quality

Here is the formula: Corn sugar, 20 lb.; premelt sugar, 15 gal. invert sugar, 10 lb.; gelatin, 4½ lb.; corn syrup, 1 gal.; and vanilla, 2 oz.

Especially important in marshmallow production is accurate moisture control. It was found that 'mallows approaching the 16% moisture-content level are best for making and handling operations under Southern weather conditions. Higher moisture results in marshmallows that are too sticky and, in extreme cases, spoil. On the other hand, if moisture content is much below 16%, then the confection becomes tough and rubbery.

Emphasis on Control

Now, with installation of an air-conditioning system, production no longer is seasonal. Adverse temperature and humidity, which tend to make marshmallows tough or sticky, "may come up to the door, but they don't get in."

As with other candies produced at Brock's, the strict control maintained over quality of the marshmallows goes all the way back to the raw materials going into their manufacture.

Constant tests are carried out at each process station to assure that quality and product uniformity measure up to standards. While such exactness may seem extreme, Brock feels that it is essential to the production of top grade 'mallows that accent excellent appearance and consumer appeal.

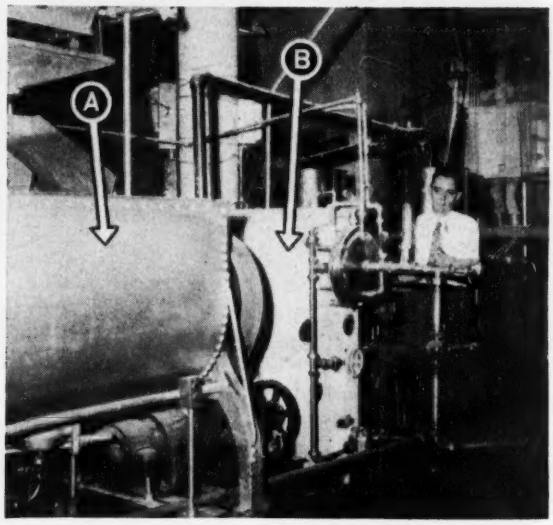
Color, Flavor Accuracy

Now that colored marshmallows have become popular, various hues have been developed for the confection, and in addition a variety of flavors. Key to quality in the production of these items is accurate lab control of amount of color and flavor to insure batch uniformity.

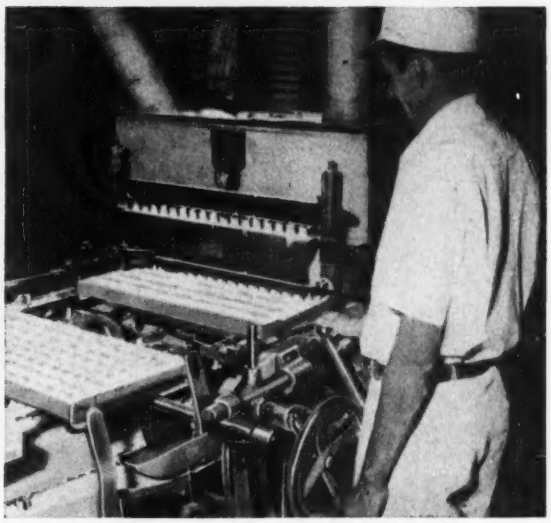
To increase output and cut costs, the company adopted a continuous, labor-saving production line.

Syrup-gelatin mix is first blended at 120 deg. F. for 5 min. in a company-built pre-mixing tank. From here, the blend gets a 45-sec. whip in a continuous Oakes mixer. Filtered, compressed air, under a pressure of 80 psi., is injected via the mixing head to blend with the gelatin-syrup mix and thus whip up into a marshmallow. The marshmallow mix then is

"That Extra Check" . . .



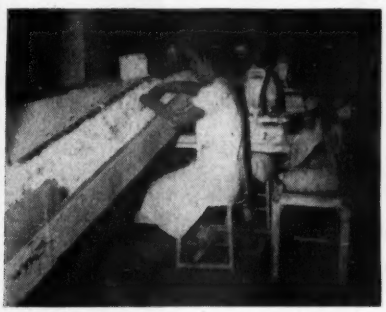
NON-VARYING is the quality of marshmallow run from pre-mixer (A) through continuous blender (B).



CLOSE CHECK on performance of depositor achieves product of precise size and weight.

. . . As Marshmallows Whisk Through En Masse

CARTON-PACKING is "upped" 15% on newly devised double-belt line for cartons and marshmallows.



BAGGING is faster on this new packing line. Marshmallows are weighed, then packed into bags. . .

. . . THAT are carried in upright position on belt conveyor riding trough to bag-sealing machine.

delivered through stainless steel pipes to the depositing machine.

Care is exercised at the depositor to be certain of obtaining uniformity in the size, weight, and appearance of the cast marshmallows. Filled starch trays are stacked for 24 hr. of aging in an air-conditioned room (72 F. and 50% humidity).

From storage, trays are transferred to the depositor. Here, marshmallows are screened, coated with finely pulverized sugar, and belt-conveyed to the air-conditioned packaging room.

The company-designed packaging line was built to handle candy products other than marshmallows. It comprises a special cloth belt that travels through a U-shaped trough. This trough holds cellophane bags (in upright position) traveling to a sealing machine at the end of the line.

Efficiency innovation in this conveyor-packing line is the speedy, labor-saving method of bagging the confection. As marshmallows are belt-conveyed along packing stations, girls slide them onto scales. Marshmallows then are dumped into bags, which continue to the sealing machine.

Faster Carton Packing

Those marshmallows not bagged are recirculated by belt conveyor, back to the packaging line to assure a constant supply. Thus, with a good supply of candy on the packing conveyor, production moves along more swiftly. Resultant steady flow of bagged goods to the sealing machine has meant the end of former costly line delays. Bagged marshmallows coming from sealing machine are packed in shipping cases and trucked to shipping.

Considerable difficulty had been experienced on the "boat"-packing line. After studies and tests, the firm engineered a new line.

Set up was a carton-forming machine from which boxes automatically are discharged onto a belt conveyor for marshmallow packaging. Now each girl of the crew packs three marshmallows into each belt-conveyed carton that passes her. In this way, speed of the line has been increased. Cartons move along past the packers until two layers (each with 15 marshmallows) are formed in each box.

Handling Minimized

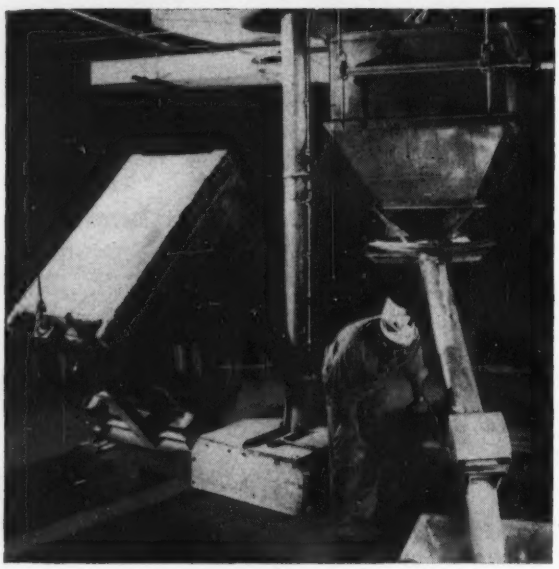
With the new system, output has been stepped up at least 15%—with a notable decrease in materials handling. The firm now packs a stronger, better-looking carton, compared to the former, pre-fabricated "boats" that were fed to each station and individually packed.

Sugar quickly unloaded . . .

Placed on tilting dumper . . .

Bins Pay Off Five Ways At Lipton Plant

1. Reduce sugar price. 2. Save storage space. 3. Speed materials handling. 4. Prevent contamination. 5. Avoid moisture-pickup in the finished product



And emptied to process

REALIZING that one of the best places to cut costs is in the materials handling department, Thos. J. Lipton, Inc., Hoboken, N. J., installed a portable-bin system for handling sugar used in frozen dessert mixes.

And it gets a plus-value from the bins by storing finished product in them under air-tight seal.

A commercial trucker picks up twelve empty Tote Bins at the plant and hauls them to the sugar refinery. There they are loaded with about 3,500 lb. of sugar each, directly from the refinery storage bins, and without being removed from the flat-bed trailer.

Back at the Lipton plant after a short run, the truck is unloaded by one man in 15 min. In comparison, a pallet-and-bag operation takes about an hour.

The bins are lift-trucked into the plant and either emptied right into the process or compactly stored to be used as needed.

From a tilting dump rack, the sugar is screw-conveyed to a vertical elevator. This, in turn, conveys the material to an automatic weigh hopper supplying stainless steel blenders.

How System Pays

By eliminating disposable containers, the refinery can offer a bulk discount which is, in the case of sugar, 15¢ a hundredweight—a worthwhile saving for the purchaser.

A considerable labor saving is effected in receiving, warehousing and discharging.

The entire operation is cleaner, neater. There is no breakage, spillage, dusting, or product deterioration or contamination. Also, storage space and costs are reduced.

At Lipton's the system paid for itself out of cash savings in less than one year.

Solve Moisture Problem

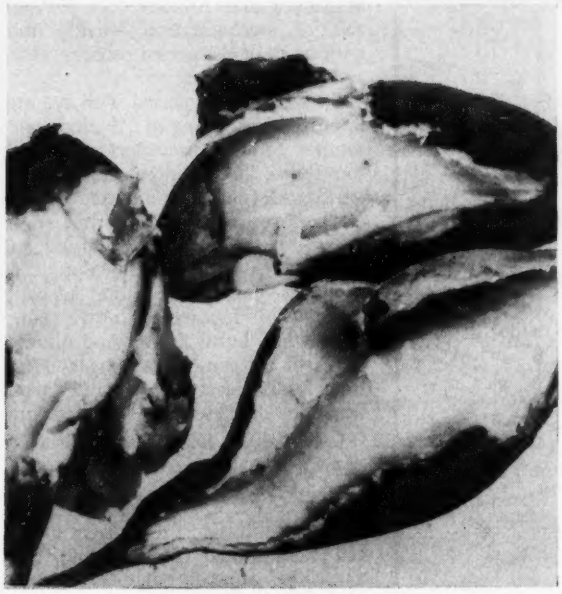
Lipton's finds a plus in using additional bins for in-plant storage of the finished product, which is a very hygroscopic material.

Before, the product was kept in standard containers while awaiting packaging. This meant that the product could be held only for very short periods of time—usually it was prepared and packaged the same day.

If a batch of material were to be held for any time, it was necessary to seal the material in 55-gal. gasketed drums with silica gel to absorb any moisture leakage and keep the product dry.

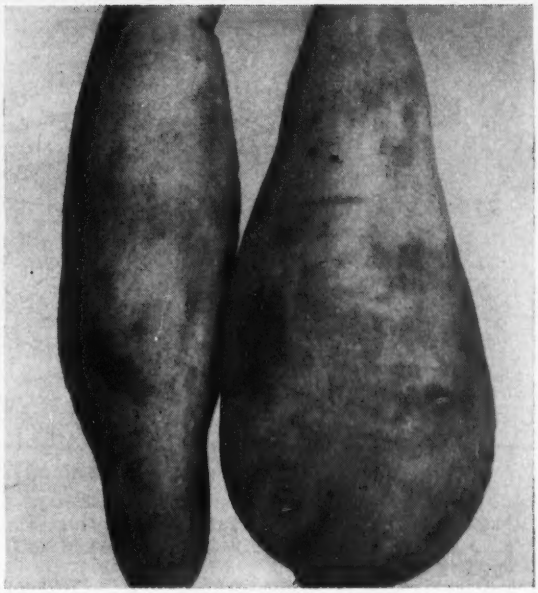
The Tote Bins, which can be hermetically sealed, proved to be the ideal answer to this problem.

Now the product can be held for as long as two weeks without moisture pickup.



How Good Peeling . . .

Peeling was done here with 30 sec. of 90-lb. steam, followed by abrupt release of pressure.



. . . Gives Smooth Sweets

With either steam-pressure or lye peeling, most of surface irregularities of the sweets are removed.

Research Solves Problems in

Canning Sweet Potatoes

Best varieties listed . . . Improved storage and handling methods described . . . New processing techniques cited

J. G. WOODROOF, W. E. DuPREE, and S. R. CECIL
Georgia Experiment Station, Experiment, Ga.

Sweet potatoes are nutritious, high in energy value. They generally are liked when served as a vegetable, in breadstuffs, as desserts, or in meat combinations. When canned they have the sweetness of a fruit and body of a vegetable, and may be served as a part of any meal.

Very few commodities may be served in as many ways, on as many occasions, or as often as sweet potatoes.

While composed chiefly of starch and sugar, they also contain calcium, phosphorus, and iron, as well as carotene, thiamine, riboflavin, niacin, and ascorbic acid.

How the sweet potato is canned is detailed and explained in our accompanying flowsheet panel. But before the product is processed, suitable varieties must, of course, be selected. Accordingly, we list 28 canning varieties (Table I) in order of preference.

Most Porto Rico strains, Allgold T-3, and other moist-type varieties are favored when cured before canning, while Goldrush, Easter Porto Rico, and Early Port are preferred when canned uncured. While the Porto Rico-type potatoes have excellent flavor and are most generally canned, they lack color and desirable texture.

Quality Factors

Both objective and subjective measurements show that as the storage period of sweet potatoes increases, texture of the canned product becomes softer, and flavor becomes more desirable for about 12 weeks. Then it drops to about the same as immediately after digging.

Color changes from a bright yellow to orange during the first 8 weeks, then becomes slightly brown. Clarity of the syrup increases for about 8 weeks, then slightly decreases.

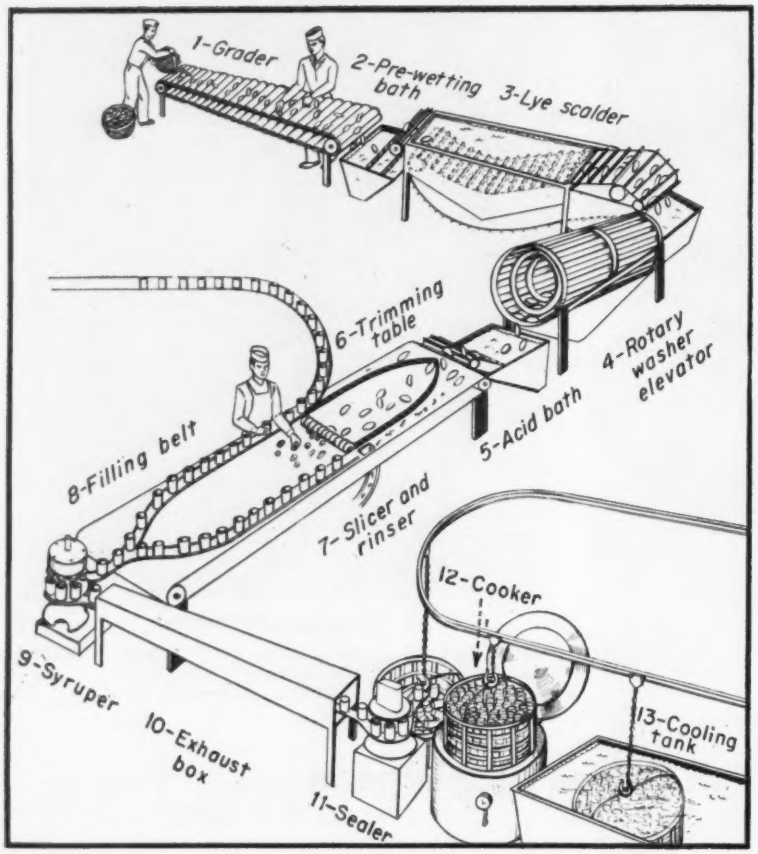
Porto Rico potatoes put through a curing house or cured in homemade hills are of about equal value for canning and are preferred to potatoes allowed to cure gradually in a shed.

It is found necessary to can sweets that are disease- and insect-free in order to keep peeling and trimming losses low, to avoid excessive trimming cost and to maintain high quality.

Down to Details

Peeling results in 10-to-60% losses (Table II), depending upon the method of peeling, size of potatoes, degree of curing, length of storage period, and variety. Two methods of peeling are successful—lye (10% solution at 210-215 deg. F. for 6 min. for uncured, and 10 min. for cured potatoes), or steam pressure (up to 90 lb. for 30 to 360 sec.) that is released suddenly.

Four peeling methods — boiling water, explosion in vacuum, flame, and abrasion—are unsuccessful. Factors determining the suitability of a method



IN THIS PLANT SETUP, grading, peeling, and washing run 10 min., followed by trimming, packing, syruping, and closing entailing 15 min.

Equipment employed, what it does, and specifications—

1. Grader: **Sorts, grades, and removes coarse dirt . . . Belt unit, either wood rollers or galvanized flat wire, is 20 ft. long, 12 in. wide. Its speed is 40 fpm.**

2. Washer and Preheating Bath: **Washes and heats sweets prior to peeling . . . Unit is 10 ft. long and 18 in. wide. It may be part of the lye scalder (3). A detergent may be used.**

3. Lye Scalder: **Disintegrates peel . . . Of Draper type, unit is 30 ft. long, 18 in. wide, has 500-gal. capacity. Employed is 8-10% lye at 215 deg. F.**

Note: Instead of lye scalder, a steam vegetable peeler may be used. In latter, potatoes are under pressure up to 90 psi. from 30 to 360 sec., depending on variety and condition. Then pressure is suddenly released to remove peel. Unit has cylinder for maintaining pressure, worm drive, automatic intake, and discharge valve. Dimensions: 12 ft. long, 2 ft. dia.

4. Rotary Washer Elevator: **Completely removes peel and conveys to drain . . . Squirrel cage type with at least 12 fine sprays and spiral baffle to regulate motion. Measures 12 ft. long by 2 ft. dia.**

5. Acid Bath: **Removes traces of lye, prevents darkening . . . Measures 4 ft. long, 2 ft. dia. Uses 2% citric acid solution.**

Note: This unit is optional with steam pressure peeler.

6. Trimming Belt: **Inedible or objectional parts hand trimmed . . . Running 40 ft. and with 2 ft. width, it has stainless woven-wire belt. Speed is 25 fpm.**

7. Slicer and Rinser: **Cuts potatoes to desired size and shape. Rinser (not shown) removes starch . . . Series of saws or knives placed ¾ in. apart, or special arrangement of dicing knives. Fine water spray for rinsing.**

8. Filling Belt: **For filling cans from either side . . . Stainless woven-wire belt, 60 ft. long, 2 ft. wide. Speed is 25 fpm.**

9. Syruper: **Connects with hot syrup reservoir and is suspended above overflow basin . . . Has 12 valves and diamond chain feed.**

10. Exhaust Box: **Heats product to 180 deg. F. internal temperature . . . Single deck, double run, 12-in. disks. Unit is suitable for hot water or steam.**

11. Sealer: **Closed at 170 F., cans have 10-in. vacuum; at 150 F., no vacuum. (Closing at 125 F. results in "flippers"; at 100 F., "swells.") . . . Standard, commercial, automatic unit for particular type of can used.**

12. Cooker: **Schedule varies with size of can, style of pack, and type of cooker. Cans processed 60 min. at 240 F. show no spoilage after incubation at 95 F. for 15 days . . . Standard retort or continuous.**

13. Cooling Tank: **Cans, in single tier or standard retort crates, cooled to 100 F. internal temperature. Cooling rate markedly affects quality. No. 2½ cans cooled under water sprays have good sheen and color . . . Unit is 40 ft. long, 4 ft. deep, 4 ft. wide.**

of peeling are: Efficiency of peeling, ease of mechanization, quality and uniformity of the peeled product, cost, and speed of operation.

Sweet potatoes peeled with lye are improved by dipping in 2% citric acid solution to neutralize traces of lye and to stabilize the yellow color. Traces of citric acid (enough to lower the pH of the syrup to 4.95) absorbed from the acid bath improve the appearance, color, and flavor of the canned product.

Traces of alkali from the lye bath cause a dull appearance, brown color, and slightly burnt flavor. And minute traces of rot cause darkening and extremely disagreeable aroma and flavor. But none of these causes spoilage under commercial processing conditions.

Kind of Sugar

While only slight differences in appearance, aroma, color, texture, and flavor of canned potatoes can be traced to the kind of sugar used, potatoes canned in straight sucrose are preferred in flavor and are equally good in other qualities.

Concentration of syrup used influences appearance, flavor, texture, and color of the canned product. If the total of soluble solids in the syrup is less than about 25%, the product becomes soft, water logged, and lacks flavor. When the syrup concentration is 30% or higher, the sweets retain firmness and improve in flavor. Addition of enough 40-45% sucrose syrup to cover the product in the cans is most satisfactory.

Three types of discoloration are recognized in canning sweets–

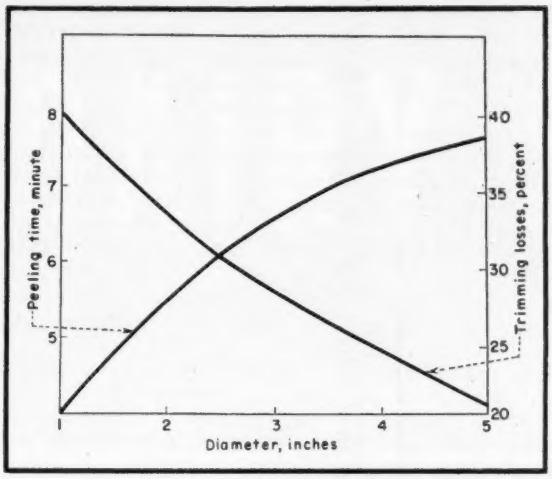
1. *Enzymatic*—evidenced by black streaks or areas during curing, storage, or early stages of canning. It is controlled by careful selection of the potatoes and preheating prior to peeling.

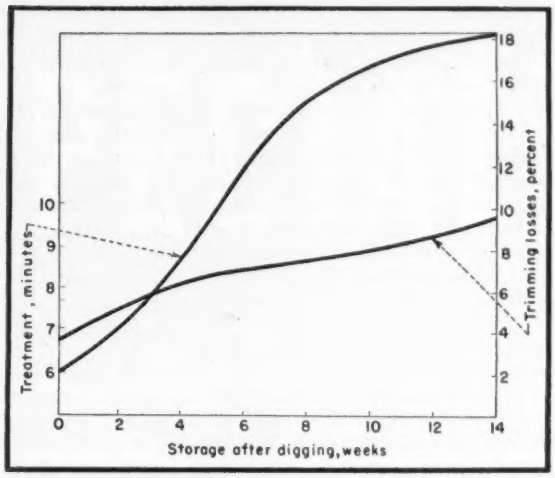
2. *Metallic* — indicated by black areas after coming in contact with iron, controlled by stainless.

3. *Browning* — seen after heating and resulting from the browning reaction. The caramel-like color and flavor thus caused in the finished product grows worse during storage. This is controlled by rapid processing, careful selection of sweeteners, and storage of canned potatoes in a cool place.

No off-flavor has been found to be imparted to the canned product when certain insecticides — toxaphene, isotox, chlordane, or aldrin—are applied to the leaves of the plants at the strength recommended for insect control, or are used in transplanting water, put in the soil with the fertilizers, or broadcast over the soil.

From these results, it appears that sweet potatoes for canning should be harvested when mature, put through





Size and Storage Affect Peeling Time and Trimming Loss

THE SMALLER the potato, the shorter the peeling time (either lye or steam pressure) and the larger the trimming loss. Reverse is true of big sweets.

AS STORAGE PERIOD of sweet potatoes increases, there is a gradual rise in trimming losses and a marked increase in time of treatment with lye.

a curing house or cured in homemade hills, peeled with lye or steam pressure, packed (whole or cut) in No. 2½ cans covered with 45% sucrose syrup, processed at 10 lb. steam pressure for 45 min., cooled in a water spray, and stored, subsequently, in a cool place.

One of the advantages is the variety of styles and types in which sweets may be canned, which in turn increases the ways of serving them. **Styles**—According to the U. S. Standards for Grades of Canned Sweet Potatoes, the following styles of packs are recognized:

Whole—when approximate original conformation of the prepared sweet potatoes is retained.

Sensory Evaluations . . . Losses and Yields . . . Alkali Demands

TABLE I—28 VARIETIES and How They Rate

Variety	Qualities: Appearance (20)	Aroma (10)	Color (20)	Texture (20)	Flavor (30)	Total (100)	Comment
Australian Canner	20	9	17	16	25	87	Very uniform, good color, flavor
130-155-33	17	8	18	16	26	87	Good color, uniform
Oklahoma 24	16	8	15	16	26	81	Smooth, soft, good flavor
Easter Porto Rico	15	8	16	16	24	79	Color too light, good flavor
Early Port	16	8	16	15	23	78	Color light, very good otherwise
Orlis	15	8	17	15	23	78	Color good, smooth, some off color
T-6	15	8	15	16	21	75	Dark, lacking sweetness
Allgold	15	8	15	15	21	74	Lacking in color uniformity
Oklahoma 17	18	8	13	15	20	74	Good color, dull, good flavor
Sunnyside	14	8	14	14	22	72	Poor structure, stringy
Unit I Porto Rico	15	8	12	14	23	72	Not uniform in color, very good flavor
11-OP-7	13	7	17	14	21	72	Good appearance, fair texture and flavor
B-5099	16	8	15	13	19	71	Lacking in flavor, very good color
Goldrush	14	8	15	13	21	71	Too soft, dull, good flavor
H-S-L-165-26	15	8	13	13	22	71	Streaky and stringy
11-OP-33	15	8	14	14	19	70	Appearance good, poor flavor and texture
Ga. Bunch Porto Rico	14	8	12	13	22	69	Poor color and texture, good flavor
Leeland Bunch	13	7	13	14	22	69	Not uniform, dark, good texture and flavor
T-3	13	7	13	14	22	69	Not uniform, poor flavor
Texas Bush	13	8	14	13	21	69	Too light, not uniform
B-4570	14	8	11	12	22	67	Good flavor, too light and soft
C-51-38	15	8	12	12	20	67	Poor texture, variegated
L-224	14	8	14	12	19	67	Stringy, color not uniform
6-L-113-12	15	8	12	12	19	66	Stringy and poor flavor
L-124-4	14	8	9	13	19	63	Too light, poor flavor
Heartogold	13	8	10	12	18	61	Soft, variegated
Oklahoma 26	14	7	12	11	17	61	Good color, poor flavor and texture
T-1	12	8	10	10	18	58	Too dark, too soft

TABLE II—PEELING AND TRIMMING Losses of Nine Varieties

Variety	Peeling Loss (%)	Trimming Loss (%)	Yield (%)
6-45013	19.6	6.0	74.4
Oklahoma 24	20.3	8.1	71.6
Heartogold	21.8	6.5	71.6
Unit 1 Porto Rico	23.2	9.4	67.4
L-224	21.4	12.3	66.3
Australian Canner	26.4	9.2	64.4
Bunch Porto Rico	25.3	11.0	63.7
B-5944	24.9	13.9	61.2
B-5941	24.5	14.6	60.9

TABLE III—ALKALI REQUIRED per 1,000 Lb. of Potatoes Peeled in Draper-Type Scalder With Closed Coils

Grade of Potatoes	Alkali Required: For Peeling (Lb.)	Losses (Lb.)	Total (Lb.)
Freshly dug field run	4.8	1.6	6.4
Cured small (1" to 1⅛")	17.5	9.5	27.8
Cured small (1⅛" to 2⅛")	14.6	5.2	19.8
Cured medium (2⅛" to 3⅛")	12.7	5.1	17.8
Cured large (3⅛" to 4⅛")	11.1	4.9	16.0
Cured jumbo (above 4⅛")	9.3	4.9	14.2

Pieces—consisting of cut or broken units of prepared sweet potatoes.

Mashed—when prepared product is wholly comminuted or crushed.

Combination—of two or more of the above.

Style of pack depends upon: (1) Grade of the raw potatoes, especially the size; (2) manner of serving—candied, pies, souffles, and with meats; (3) variety, especially referring to firmness. Different styles of packs require different grades of potatoes, slightly different preparation equipment, different processing times, and are priced differently.

Whenever practical, canning potatoes whole is desirable because this utilizes potatoes too small to be otherwise marketed, and at a price higher than that for cut or mashed potatoes.

Also canned whole potatoes remain more solid and the syrup is clearer. This is especially true for potatoes held in storage for two or more months, and they are preferred to cut potatoes for serving in the home or institution, since the size and shape are more uniform.

Other than being slightly softer and more irregular in shape, quality of the cut product is equal to that of whole potatoes. In many commercial packs whole and cut potatoes are mixed in the can and so labeled.

Mashed sweet potatoes are prepared from any size of raw, sound potatoes, without thoroughly mixing or removing the strings. They are preferred for pies, souffles, and puddings. Puree or modifications of this style include baby foods to which sufficient water is added to render the product soupy, and pie stock to which syrup, spices, and fruit, such as raisins or coconut, are added.

Sweet potato puree is improved in consistency and flavor by the addition of 20% by weight of 50% syrup containing 0.2% citric acid.

There are several advantages in packing high quality sweet potato puree: (1) Product can be rapidly and efficiently prepared from cooked, peeled potatoes by stainless steel finishers; (2) puree is easily standardized in color and consistency, irrespective of the size of potatoes; (3) fibers, hard areas, and strings are completely removed or disintegrated. A large proportion of canned sweet potatoes are consumed in the form of puree.

Types—In addition to the above styles, sweet potatoes may be canned in either of the following types of packs:

1. *In a liquid packing medium*
2. *Vacuum packed without packing medium*
3. *Solid or dry-pack*

Practically all sweets canned in Georgia and throughout the South are in syrup, and Porto Rico potatoes are most suitable for this type of pack. In the Middle Atlantic States, where the Maryland Golden or other varieties of dry, firm potatoes are grown, the vacuum pack is used.

Solid or dry-pack was more common 10 yr. ago than today. This related to the fact that in those days the product was marked by non-uniformity of color in the can, lack of added sugar, longer processing time, and limited menu application.

Size Important

Grading sweet potatoes before peeling according to size, shape, color, variety, and degree of curing is essential for minimum peeling losses and uniformity of product. Also, the style and type of pack depends largely upon the size of potatoes.

Commercial plant data for cured Porto Rico potatoes, show 45% yield of prepared product from 12,740 lb. of potatoes of 1-2 in. dia., and 58.3% yield from 5,400 lb. of sweets of 2-5 in. dia.

Sweet potatoes bought from farmers or on the open market may be graded according to U. S. Standards for Grades of Sweet Potatoes.

Curing Effects

During curing, sweet potatoes undergo many changes, most of which improve the quality of the canned product. Curing involves the special treatment given soon after harvesting, the potatoes being held about 10 days at 85-90 deg. F. and 90% relative humidity.

After curing, the temperature is lowered to 55-60 F. and a humidity low enough (about 80%) to prevent condensation and sprouting. During storage, physical and chemical changes continue as a result of enzymatic action, respiration, and transpiration.

Major changes during curing and storing of sweet potatoes are:

1. *Change of starch to sugars*, which accounts for the increased sweetness of potatoes during curing and is evidenced by improvement in flavor of the canned product.
2. *Loss in weight*, occurring rather rapidly during curing and continuing slowly throughout the storage period, due to respiration and transpiration. This is a disadvantage when storing to prolong the canning season.
3. *Toughening of the cortex* or peel during curing. Resulting from loss of moisture and from wound healing, this produces a case hardening effect. While increasing the resistance of potatoes to mechanical injury and disease, this renders peeling more difficult. Indicating such toughening are the increase in time required for lye peeling and need for greater lye concentration or higher temperature.
4. *Softening of texture* associated with disappearance of starch. This begins and continues during storage. Of nine varieties cured and stored for six months before being canned, those remaining in perfect condition, insofar as texture was concerned, were: Oklahoma 17, Australian Canner, Heartogold, Oklahoma 24, Early Port, B-4570, and C-11. Georgia Bunch Porto Rico was definitely soft and spongy, and L-241 was soft, dry, and spongy.
5. *Increase in flavor* accompanying a decrease in starch and the moisture content and an accumulation of sugars. Other desirable flavors, not due directly to sweetness, are apparently present in cured sweet potatoes of some varieties. Also, certain varieties increase in flavor more than others during curing and storing.
6. *Increase in color*. This is slight but noticeable after several weeks in storage before canning.

Uncured vs. Cured

There is no single answer in determining optimum degree of curing of sweet potatoes before canning. Some varieties are more suitable if canned freshly dug, some improve in flavor and lose in texture during curing, and others are equally good if canned uncured or cured.

Advantages in canning freshly dug potatoes are that losses due to rotting and the cost of handling and curing are reduced. However, the season of canning is shortened to a few weeks, while it could be extended to four or five months by using cured and stored sweet potatoes. When all factors are considered, potatoes cured and stored for two to four weeks are preferred for canning.

Among the varieties preferred uncured (based on an equal evaluation of color, texture, and flavor) is Easter Porto Rico. Those preferred cured are Allgold, T-6, and Georgia Bunch Porto Rico. There is little preference for Early Port, Goldrush, Sunnyside, Leeland Bunch, Oklahoma 26, and B-5999.

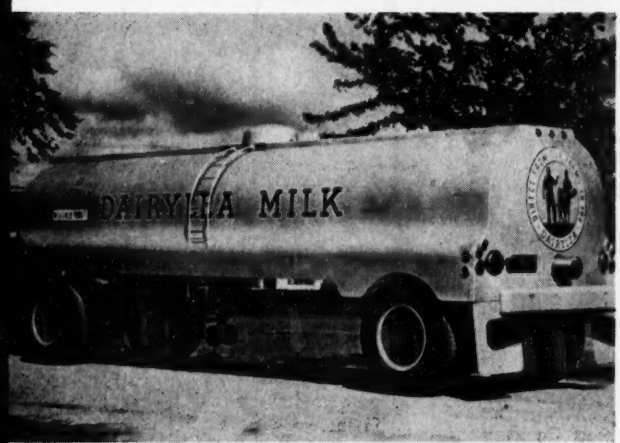
Quality points—appearance, color, aroma, texture, and flavor—increase during curing and storage up to four weeks, then gradually decrease. At no time during a 22-week period of investigation were they below that of potatoes canned fresh.

Syrup on canned cured potatoes is clearer than on those uncured. Amount of suspended material is inversely proportional to the amount of curing (conversion of starch to sugars).

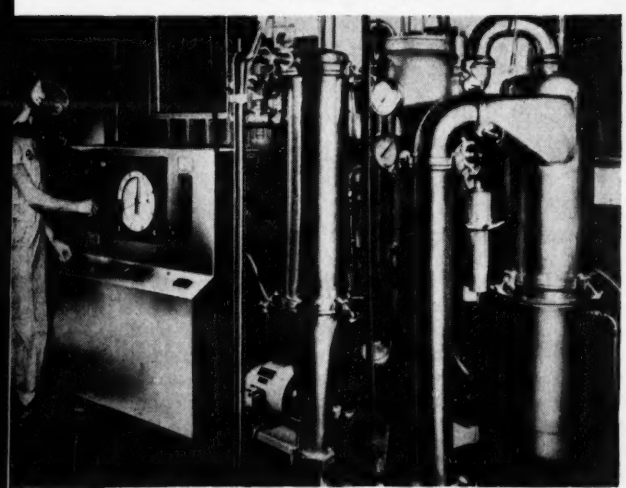
(*Turn to page 238*)

DAIRY SPECIAL

Special Section of FOOD ENGINEERING, October, 1954



LIGHTWEIGHT plastic milk tank is easy to maintain.



pH CONTROL typifies moves toward automatic process.

NON-CAKING, fluffed dry milk pours from carton, dissolves immediately.

Dairymen Face Challenging Changes 70
New Process for Instant Dry Milk 74
Controls Presage Automatic Dairy 78
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Cheese Keeps in Antimycotic Wrap 93
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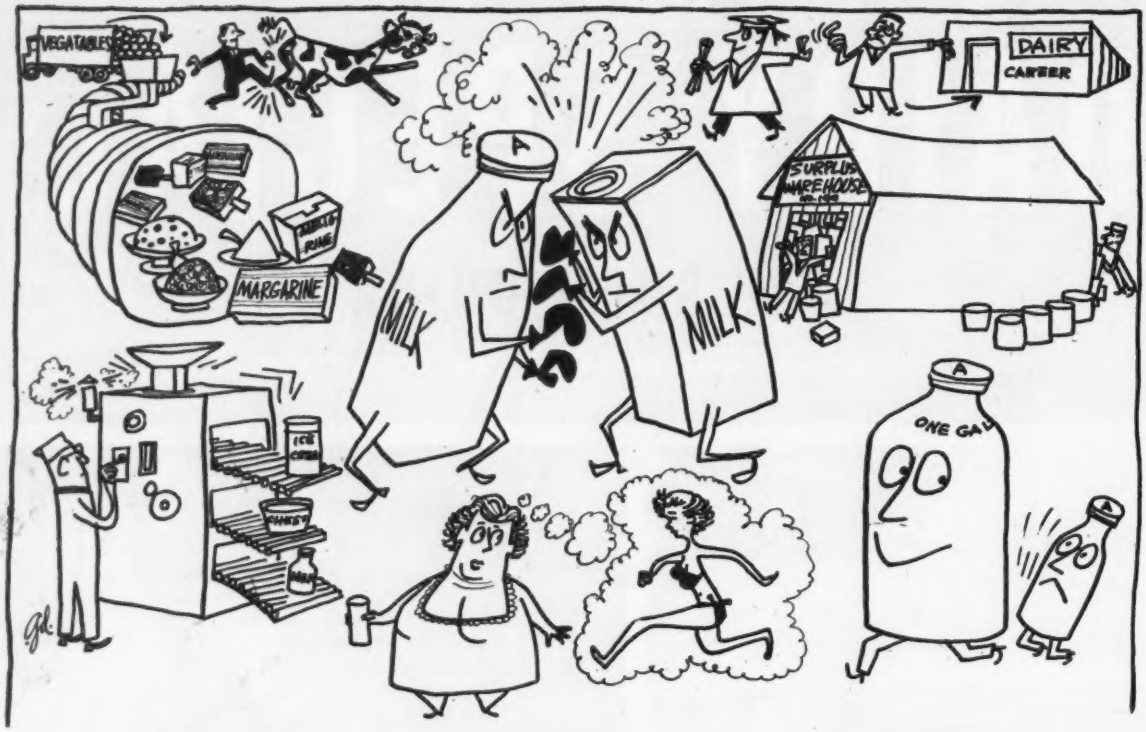


CHALLENGING CHANGES

They Demand "Doing" by Dairymen

Today's radical departures are throwing the unwary off balance—and actually tripping the over-complacent . . . Here are closeups of the piercing problems and straight-from-the-shoulder suggestions for coping with them

I. A. GOULD
Department of Dairy Technology, The Ohio State University, Columbus, Ohio.

ABRAHAM LINCOLN once observed—

. If we could first know where we are and whither we are tending, we could better judge what to do and how to do it.

So, as we view the modern dynamic dairy field, which is in the throes of many important developments, it is perhaps wise that we take stock of the changes occurring and appraise the challenges presented.

Face of the dairy field is changing rapidly. There is less land for agriculture. There is a marked decrease annually in the number of dairy farms. And there is a marked increase in size of those farms remaining.

The dairy plant picture is similar. Number of dairy plants is decreasing rapidly, many small plants disappearing each year. As an example, in one large Midwest market 10 yr. ago there were 145 milk plants. But one year ago there were but 53. And today there are only 32.

There is a trend to amalgamation of smaller plants to form larger ones, with the last two years witnessing marked expansion of some of the larger chain organizations.

Some persons have expressed the belief that the days of the small-sized plant are numbered. But this is vigorously disputed by others. Certainly, this would appear true —that, large or small, the dairy plant is faced with the necessity of accepting, and perhaps anticipating, those changes which are inevitable and then making plans to solve the problems that will be created.

The old adage, "The waves of progress sweep o'er the unchanging man and wash him out," is most applicable to the dairy field today.

Population in the U. S. is rising rapidly, with predictions of a population of 190 million by 1975. Over the years, the population has been increasing at a 25% rate—in contrast to a 5% rate of rise in the milk supply. However, the recent unexpected rate of increase in milk supply is above this normal trend.

These changes and trends create both a problem and a challenge for the dairy manufacturer. He cannot be assured that the present surplus of milk will last. In fact, shortages in the future are not an impossibility unless present high rate of milk production continues. Long-range planning is, therefore, essential.

The procurement picture is changing rapidly as it relates to the raw milk supply. There has been great urging

for a "single standard" to eliminate differences between milk for manufactured use and that for immediate fluid consumption. Definite progress has been made in this connection.

Not long ago, each market was considered to be a "power unto itself." No milk but that checked by its inspectors, and meeting its own, sometimes peculiar, standards, was permitted to be sold.

In addition, many markets required that milk must be processed within the environs of the market–a restriction that prevented widespread distribution from a central bottling plant.

Changes have occurred and are occurring in this connection. Reciprocity between markets is being widely practiced. Several recent court cases have established the invalidity of standards containing illogical features that restricted, unnecessarily, free flow of milk. The trend is definite in this direction.

In milk production practices, two major changes that point the way to greater efficiency and to better labor usage are: (1) The pipe line milker system, and (2) bulk handling of farm milk. In a sense, these moves are in the direction of farm mechanization. The entire operation eliminates heavy work of carrying milk and handling cans, reduces labor requirements and, if done properly, could well result in a better quality milk than is being obtained by older, more conventional methods. In many areas, tank truck pick-up occurs only every other day, so that savings in transportation costs would appear possible.

Elimination of some of the drudgery of producing milk makes dairy farming more glamorous and farm labor easier to obtain.

Today, bulk tank pick-up probably is the "hottest" subject among producers. Some areas are already greatly involved in this practice, and many others are giving careful thought to it. Its widespread use appears imminent and this trend presages larger farms.

However, its adoption will be hampered and perhaps prevented in some areas because of the small volume of milk produced per farm, and in other areas by health regulations that prevent alternate day pick-up. Furthermore, some managerial policies of the dairy plants will need to be evaluated in the light of this development.

Butter, Powder Provide Reservoir

The butter industry continues to be a major segment of the dairy field. That it is the "balance wheel" is clearly shown by the fact that surplus milk production during the past two years was converted into butter and dry milk solids-not-fat for storage. Without these, the entire field may well have been in dire straits. Also, milk in the form of butter and dehydrated products is necessary as a good reservoir should drought or other disaster result in marked and sudden reduction in the nation's milk supply.

In years past, commercial butter was made mainly from sour cream obtained directly from producers. Now, a large volume is being made from sweet cream produced from plant-separated milk.

Even though the number of sour cream producers has decreased greatly over the past several years, this segment deserves careful consideration. The creamery industry has long penalized itself by failing to embark wholeheartedly upon a quality program for farm-produced cream.

Several changes–more or less concurrent–have markedly affected the milk distribution practices, and perhaps more striking changes are in the offing. Some trends have been: (1) Less-frequent home delivery, (2) changes from glass to paper containers, and (3) increased use of multiple-quart containers.

During World War II, adoption of every-other-day delivery was considered somewhat revolutionary. Since then, the three-times-per week home delivery has become popular. It has resulted in appreciable savings that have been passed on to the consumer. It has also made possible changes in milk-handling practices within the plant to permit a 5-day work week. Within the past year, one Ohio milk handler has inaugurated a 4-day bottling schedule–Monday, Wednesday, Thursday, and Saturday. High quality of milk supply, efficient refrigeration, and effective sanitation programs make such a practice possible.

Discussions pertaining to paper-versus-glass containers continues unabated. Principal question is now–as it has been in the past–"Which is cheapest?" And the answer is not yet entirely clear. In many cases, the change is made for the purpose of meeting competition, and not with any thought of effecting economies. In fact, evidence would indicate that such a change may have resulted in a more costly operation in some cases.

Use of paper containers for wholesale distribution has been generally practiced for some time, but recently they have been adopted in some areas for retail delivery to the home. Reports indicate that there is no great consumer resistance to this change, although it must be recognized this is not tantamount to acceptance. Studies have indicated that about 30% of the consumers do not care whether milk is in paper or glass. Preferences seems to be dependent upon whether the milk is store-purchased or home delivered.*

There has also been a definite trend to multiple-quart containers, with the 2-qt. or 2-qt.-combination package being well accepted and the 1-gal. container apparently gaining favor.

* Economic study of milk container preferences by Dr. E. Baumer, Department of Agricultural Economics, The Ohio State University.

Viewed From 8 Angles—

ON PROCUREMENT

". . . There is a great urge to eliminate differences between milk for manufacture and that for fluid consumption."

ON PRODUCTION

". . . Due to its striking efficiency, bulk tank pick-up probably is the hottest subject among producers today."

ON DISTRIBUTION

". . . Markedly affecting practices are: Less-frequent home delivery . . . switches from glass to paper . . . increasing use of multi-quart containers."

ON CONSUMPTION

". . . Salesmen and merchandisers must shoulder the burden of increasing per-capita consumption of milk."

ON SPECIAL PRODUCTS

". . . Fortifying of skim milk with vitamins has rocketed sales 500-600% in recent years."

ON MELLORINE

". . . True, substitute desserts are on the rise. But remember–introduction of a new product is not always as profitable as may be indicated by savings in ingredient costs."

ON EFFICIENCY

". . . By installing CIP, enterprising dairymen have won great savings in time and cost of cleaning."

ON PERSONNEL

". . . Dairy plant management must face up to a growing man-power responsibility–to assure an increasing supply of trained men."

–I. A. Gould

Price differential between a single quart and the multiple quart is evidently a factor. However, that alone does not appear to be the only reason. The consumer's desire for "king-sized" packages is also involved since, in some markets, ½-gal. sales have "boomed" even though little or no price differential existed between quart and ½-gal.

The dairy field has faced wild and apparently illogical price-cutting in some markets with introduction of larger-than-quart containers, and many claims have been made as to increased efficiencies, lower distribution costs, and greater sales. True cost and sales facts yet await public presentation.

Higher Consumption a "Must"

Increasing the per-capita consumption of milk is a major challenge, and the burden of this rests on those engaged in sales and merchandising. Attitudes of sales branches are in need of close scrutiny. Too often, the route salesman is imbued with "getting the other guy's customers" rather than in selling his own more milk. In some cases this exchange of customers is achieved by gifts of "free" milk, by special "cut-price deals," by promising every day delivery when the market operates on three-times-per-week, and by destructive criticisms of the competitors.

These and similar practices do not increase total milk usage. Instead, they tend to tear down accepted market practices, undermine consumers' confidence, and result in increased distribution costs. Such questionable practices are the responsibility of the sales manager and usually reflect the philosophy of the company itself.

A basic solution to problems of sales and distribution is a closely-knit, local milk association, where matters of ethics and practices may be aired and where uniformity of procedures may be adopted.

Such a group, made up of honest leaders working in harmony, can bring about stability of a market, develop a low-cost cooperative sales and merchandising program, decrease distribution costs, and increase per-capita sales to a high level.

Milk companies face a major problem in lowering distribution costs. It appears reasonable that there should be a differential between store milk and home-delivered. Furthermore, distributors would be justified in giving more attention to quantity discounts for home delivered milk. Certainly, the customer receiving 10 qt. per delivery deserves a better price than one receiving a single quart.

Low Fat, Other Special Products

Desire of the consumer for the slim, svelte form—coupled with the medical "scare" of the possible direct relationship between obesity and heart disease—has resulted in an increased interest in low-fat frozen desserts and milk. Ice milk sales have grown regularly during the past few years, sales during 1953 being about 25% higher than in 1952.

Usage of skim milk fortified with vitamins A and D has increased 500-600% during recent years, and such a product is now usually considered as standard by milk distributors. Flavor and keeping-wise, skim milk often leaves much to be desired. The product tends to be flat and insipid to the taste and is highly susceptible to "stale" flavor development.

In regard to fat usage, basic scientific facts have revealed that the ingestion of fat *per se* is not necessarily related to heart trouble. Therefore, a person who likes good-flavored high-fat dairy foods should use them, and resolve to make the necessary calorie savings in some other way.

A recent retail milk item that has met with unusual sales appeal in some areas—and unexpected opposition in others—is a special mineral-vitamin fortified milk containing added iron, iodine, and a mixture of B-vitamins. In spite of the added price per quart (usually about 1¢), this product has amounted to 60-70% of total retail milk sales for some large distributors. Sales story is to "Drink this milk and throw the drug store vitamins away!"

Vigorous opposition is based on the suggestion that the consumers may be over-vitaminized. Maximum limits, as well as minimum limits, to fix amounts of these vitamins in the milk, are being requested. When one considers the freedom with which physicians prescribe tremendous dosages of vitamins and with which almost all may be purchased at the corner drug store, it appears that the relatively small quantity added to milk cannot, in any manner, be construed as being a harmful practice.

Mellorine and Other Substitutes

Substitution of other fats for milk fat in such products as evaporated "milk," frozen "dairy" desserts, and cheese has had a rebirth. Particular emphasis has been given to the frozen dessert field, where a great furor has arisen with introduction and limited legal recognition of "ice creams" in which non-milk fat was used.

Nine states legalize this type product, and production during 1953 was about 22,500,000 gal., an increase of 129% over 1952. This is small in relation to total ice cream and related-products production of about 750,000,000 gal. annually, but future of this substituted product is yet to be determined.

The dairy branch, generally, has faced this development realistically, taking the attitude that if such a product is to be produced then it should be made by those now engaged in ice cream manufacturing.

Also, dairymen must recognize, that what the consumer wants she will get, and that artificial legal barriers cannot be depended upon as a preventive of ethical competition. However, before embarking upon such a venture, it is necessary to establish that there is a "natural" consumer demand and not one created by "high-powered" promotion at the expense of the ice cream field.

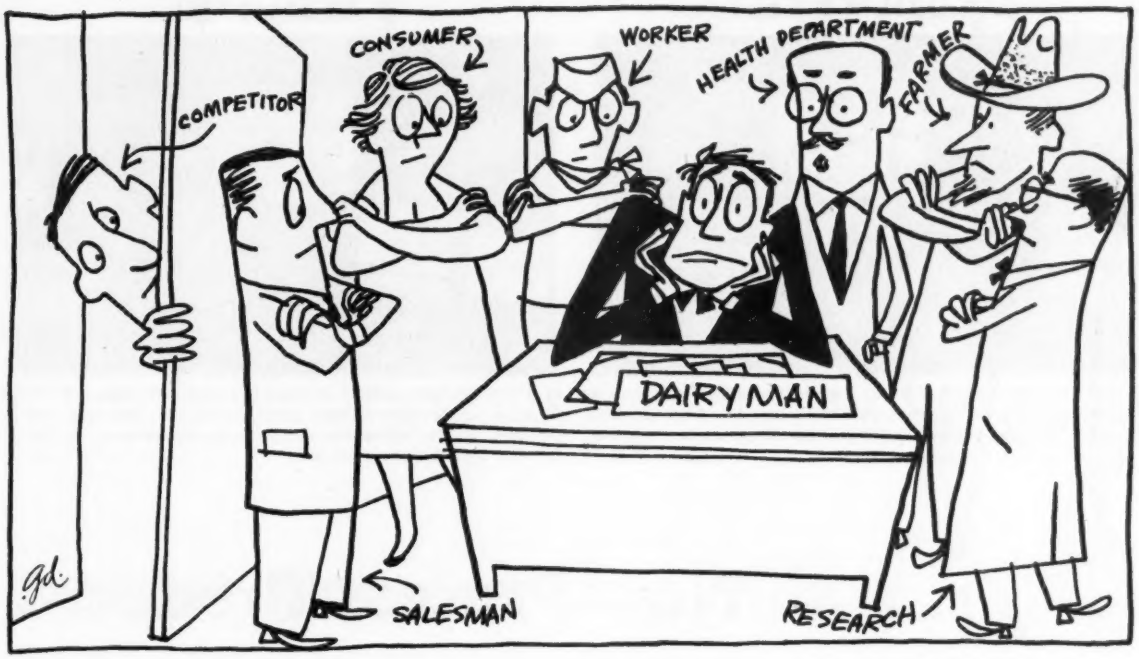
A positive public relations attitude by the latter is essential to meet the competition created by substituted products. Since price differential is the major basis for their sale, the ice cream manufacturers may well look to increased efficiencies, lower milk fat costs, greater emphasis on low-fat, less expensive dairy frozen desserts, and realistic profit margins at the retail outlets, to make "true" ice cream available at the lowest possible price.

Introduction of a new product is not always as profitable as may be indicated by savings in ingredient costs. Increased production costs, increased storage needs, higher inventories, and an expansion in sales and promotion all add to cost of final product. These extras may off-set, to a great extent, ingredient cost savings, unless volume of the new product is great and has been achieved at no decrease in regular ice cream sales.

This point is emphasized—that the savings in ingredient costs may not be passed on entirely to the consumer. Ice cream producers have learned the hard way that illogical retail pricing of the substituted frozen product may make it a relatively unprofitable item.

Efficiency Is Big Need

As indicated previously, present-day demand in dairy plant operation is efficiency!, efficiency!, and more efficiency! To obtain this requires constant thinking, planning, and action by management and employees. There are



so many aspects to this subject, and all justify exploration.

Job Analysis is a definite step to increased efficiency. It is a human weakness to take things as they are and not to determine, with firm intent, whether changes are possible. Certainly, competition demands a critical analysis of each operation with the raising of such questions as, "Is this job necessary?" and "If so, can it not be done better?"

Job analysis requires a questioning attitude in the plant and in the minds of employees—an attitude which must come from top management. It must arise from the honest desire and the earnest striving for improvement.

In general, the dairy field is far behind others in the respect. Perhaps the large number of independent plants is a reason for this. However, size is not necessarily a criterion of efficiency and, we must grant, large companies have no monopoly on brains. Logical thinking and definite action, are all that are needed for job analysis.

Work Simplification is a step to efficiency. It has been defined as the *"application of organized thinking to find easier and better methods of doing work."* It not only means a simpler job with less fatigue, but a job requiring less labor per unit of production and less wear and tear on equipment. Again, the dairies have not, perhaps, proceeded as vigorously as companies in other fields of work.

The bulk tank pick-up of farm milk is an example of a rapidly growing development illustrating the producer's interest in work simplification and his willingness to do something about it.

An outstanding work simplification development in manufacturing plants has been the rapid and general acceptance of improved cleaning practices, mainly cleaning-in-place (CIP) of sanitary pipelines and equipment. Its recent wide-spread acceptance by health departments and dairies alike has exceeded the fondest dreams of those who proposed it.

Among the factors that have made possible this growth are: (a) New cleaning materials, (b) in-the-field demonstrations to prove its feasibility, and (c) the open-minded attitude of health officials.

Acceptance of CIP has resulted in great savings in time and cost of cleaning, and, also, in less deterioration of pipelines and equipment. Of especial importance, too, is the fact that it eliminates some of the drudgery that has made it difficult to get, and keep, the right type of personnel.

The Laboratory: As an efficiency move, it would appear that every plant, whether small or large, should have a laboratory and/or a program that is concerned with control of composition as well as quality of the product. It is shocking to find large-volume dairy manufacturing plants that have no laboratory program nor any technical men who are concerned with product wastage.

Also not uncommon are dairy products that vary widely in composition, despite the fact that they come from supposedly well-run plants. With the great urge to "get-the-products-out," perhaps there is not enough effort in the direction of insuring quality and uniformity.

The laboratory can well be a money-maker for the plant if top management is sold on it and its program and takes the necessary steps to make it effective. In this connection, the laboratory director should be responsible directly to top management. From the quality standpoint, the ultimate judge is the consumer. Therefore, the control program should be such as to assure the consumer a product that is uniform in composition and high in quality.

Engineer's Pertinent Role

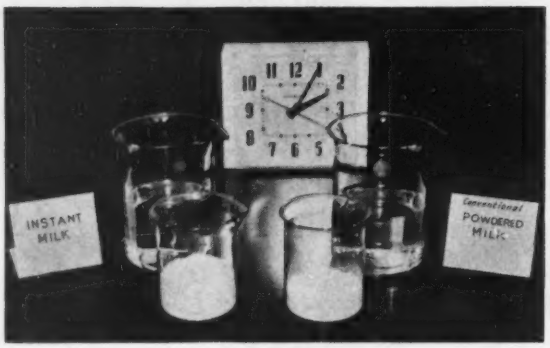
Awakening dairies to the need for more streamlining and improvements in procedures and methods has made possible a "field day" for the dairy engineer. Much has been accomplished by engineering thinking, and much more awaits to be done.

The trained dairy engineer is coming into his own. Mechanization of laborious processes, such as the turning of evaporated milk or cheese in storage, has been found possible. Continuous processes have been developed or are in the course of development.

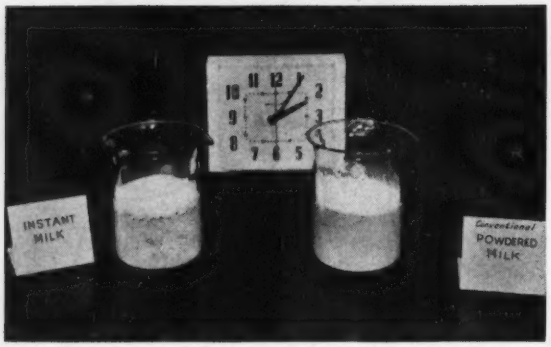
Continuous high-temperature-short-time pasteurization of milk is an accepted process, and now attention is being given to the similar processing of ice cream. Proper temperature and time of heating have now been established by U. S. Public Health Service as 175 deg. F. for 25 sec. A recent report has indicated that about 20 large companies are using some type of HTST for ice cream mix.

(*Turn to page 159*)

SOLUBILITY TEST **–At Start ↓**



1 For test comparing time required and ease of solubility, Instant Milk vs. conventional milk powder, 30g. of each powder and two beakers with 300 cc. of water were used. Note difference in powder volume.



2 Powders are added to water simultaneously. Instant Milk evidences greater wet-ability—is filtering down through water, while all but very small amount of other powder still floats on surface.

New Process Produces

It took 30 years of research to achieve this product.

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering"

SO NEW that its distribution to retail outlets began only in September, Carnation Co.'s Instant Milk is the culmination of years of research and experimentation.

It has these significant properties:

1. It dissolves very quickly, and completely, in water—even ice water.

2. Is free-flowing—doesn't cake in packages.

3. Does not foam when reconstituted.

Competition between companies trying to develop a product of this type has been keen. It literally has become a race among them to devise and patent a process for this purpose.

Dairy scientists have long recognized the marketing advantages that would result from a dried milk with physical characteristics making it quickly and easily soluble. While consumption and use of the conventional milk powder (477,000,000 lb. in 1948 and 610,200,000 lb. in 1953), has increased spectacularly in recent years, it is not easily soluble.

Remanufacturers and even housewives use mechanical mixing devices for this powder and, even then, it requires considerable time to reconstitute. When properly reconstituted to liquid form, this product is of high quality.

However, scientists have been devoting much of their attention to the ultimate end of the product's cycle—that of devising a means to produce a product that would be quick and easy to mix with water.

Instant Milk was developed and its process devised by D. D. Peebles, president, Western Condensing Co., Petaluma, Calif. The process is owned by Instant Milk Co., a corporation jointly owned by Western Condensing Co. and The Carnation Co., Los Angeles, and is marketed under the latter's trade name, "Carnation Instant Milk".

NEW PRODUCT AND PACKAGE. Note the ease of use with handy pour-spout. As seen, wet-ability of powder is almost instantaneous.

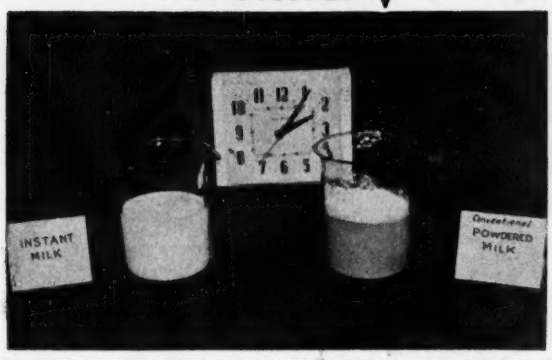
Long an outstanding figure in dairy engineering and technology, especially spray-drying of milk, Mr. Peebles began his experimental work on this process about 30 years ago.

"I was only one of many in the dairy field to foresee the possibilities of increased consumption and higher marketing potential of an easily soluble non-fat, dried milk," said Mr. Peebles. "A product such as this would find a significant place in consumers' diets, especially those in the lower income brackets. And with a product that could be easily and speedily reconstituted; was free-flowing (wouldn't cake); non-foaming; and easily stored and handled, consumers and manufacturers alike would take new interest in it".

Mr. Peebles' career in the milk industry began in 1919, when he developed an evaporator that supplanted the old-type vacuum pan for the manufacture of evaporated and condensed milk. Time and temperature were manually controlled in the old pans. But with this new unit, time and temperature were accurately and closely controlled by semi-automatic instruments.

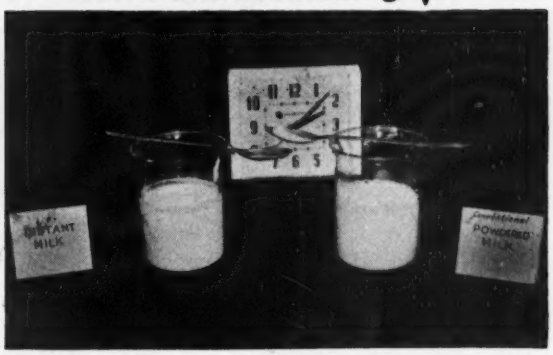
While this unit was only semi-continuous, it did make possible the evaporation of milk to lower concentrations than with the old pan. The next step was to develop, for condensed or evaporated milk, the multi-effect vacuum unit in which flow of product was continuous. This multi-effect

–At 7 Seconds ↓



3 In a matter of seconds, Instant Milk is completely immersed and rapidly dissolving, turning water milky-color even before stirring. Other powdered milk is still on surface of water.

–After brief stirring ↓



4 Instant Milk is entirely in solution after gentle stirring (in 30 sec., for all practical purposes). No surface foam remains. But other milk still has lumps (see spoon), also foam is visible on surface.

Instant Non-Fat Dry Milk

Dry milk is reprocessed to impart new characteristics

pan utilized high gas velocities and long, small diameter tubes for rising or falling films.

Stepwise Progress

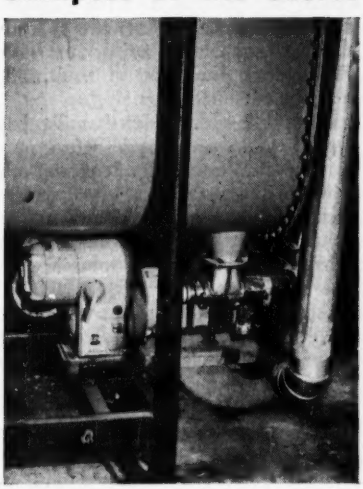
With the desired product improvements in mind, a research and experiment program was set up at Western Condensing Co.'s Petaluma laboratory. But, fresh milk is a fragile, complex product, extremely heat sensitive and, when dried, usually very hygroscopic. And, overcoming the conventional dried milk's defects (if problems of reconstituting, handling, and storage can be so defined) was not at all simple.

At the outset of these experiments, research was aimed toward refining or changing the present spray-drying process in such a manner that it would produce this new product. Trials of new types of atomizers, which sprayed fluid milk into drying chambers, were unsuccessful. These atomizers did improve the spray-dried milk process. However, they did not change the final product—it was still time-taking to reconstitute and difficult to handle and store.

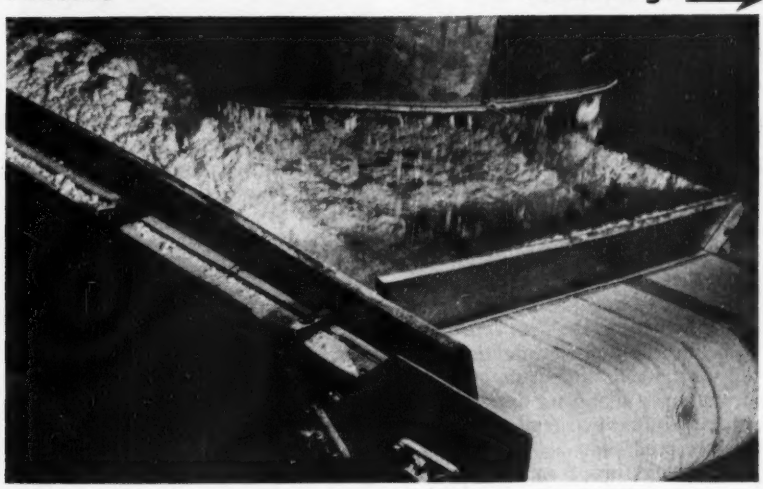
Bell-shaped atomizers and radiant heat were the next move in the experiment. But this method produced a product so hygroscopic it was too difficult to handle, package, and store,

Glimpses of the Secret Process

Turn Page →

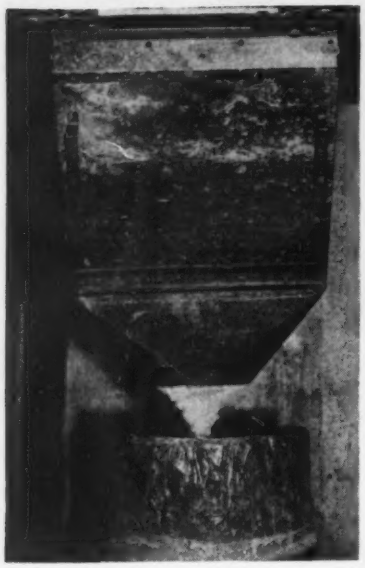


REMOVED from blender by vari-speed measuring device, powder goes into air-conveyor feeding processing unit.

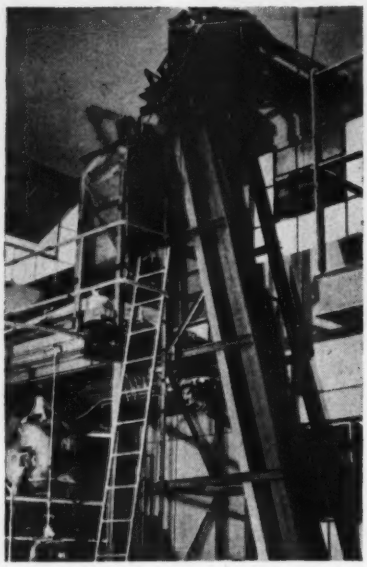


MADE SPONGE-LIKE by dispersion and gravity fall in processing unit, the product next drops out onto belt conveyor (above). From here it will move on to the two dryers.

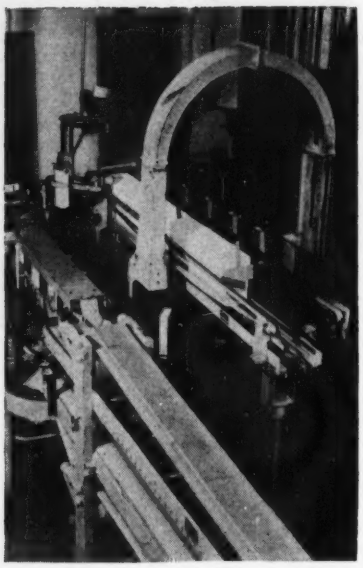
Glimpses of Instant Milk Process (Cont'd) →



FROM DRYERS, product goes through sieving and sizing units and is chuted down into drums.



RAISED by skip-hoist, drums are dumped into hopper. Product now is screened, then goes to carton filler.



CARTONS are formed and bottom flaps glued. Later on, top flaps of filled cartons are sealed here.

even though its quality proved good.

A wire-screen belt, into the interstices of which a metal roller applied a film of milk, was then tried. It was relatively simple to dry this film with a warm current of air, then remove most of it with rubber rollers. Again, this product was too expensive to produce, highly hygroscopic, and its uniformity of quality too difficult to control.

These experiments—and a great many more—led researchers to the conclusion that they were beginning at the wrong point. When recapitulating the results obtained, researchers became convinced that, while the quality of conventional dried milk might be improved, they could not produce a product with the desired characteristic by using fresh, fluid milk for the raw product.

All indications pointed toward the fact that drying methods and equipment in current use would not do more than produce the conventional type dried product. But during these experiments, there occurred a number of encouraging developments that led to the next stride.

This was using the finished spray-dried product as the "raw" material. It began to show possibilities from the start. And, after years of experimentation, a pilot-plant operation was successfully devised and the initial product produced.

Following this, a small processing line, with limited commercial production, was constructed at Western Condensing Co.'s Tulare, Calif., plant. Production from this line was planned to be used for market tests from which consumer reaction could be ascertained.

Market Testing

For the market test, the product—then labeled "Peebles Instant Milk",—was packaged in a lithographed, 10½-oz., pour-spout carton. This was overwrapped with cellophane. Price of this package, as is the case today, was 33c. Its contents will reconstitute into 3¼ qt. of standard, liquid skim milk—the equivalent of about 10c. a quart for the finished liquid product.

Sacramento and Eureka, Calif., were the two towns selected for these market tests. Sales were handled by one salesman who sold only to grocery jobbers. A well-known national advertising agency was engaged to develop an advertising program on a budget basis representative of that required to introduce a new product in these two towns.

"Time to Build!"

At the end of the first week of this program, an experienced market research man began a continuous study of the movement of this product from retailers' shelves. From the very first week, sales volume began to increase. During the final days of the test period it became difficult to supply demand with the limited production of the small processing line. It was time to build a full-scale line.

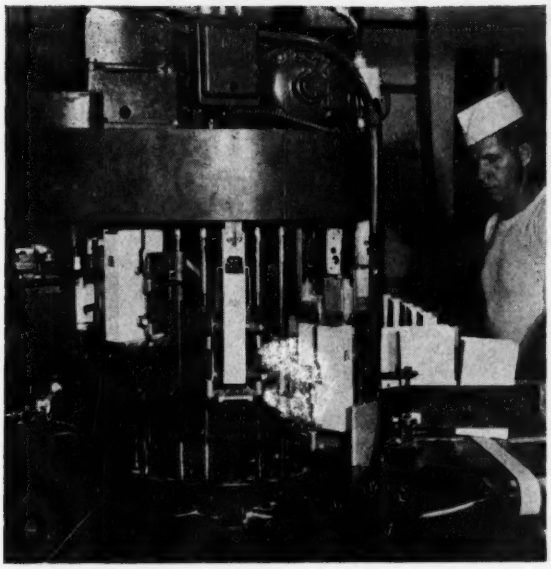
Being familiar with patent problems usually attendant on a new process such as this, FOOD ENGINEERING readers will understand that only a generalization of the process is available at this early date. Later, when patents are finalized and the process lines refined, a more complete story may be published.

The Process

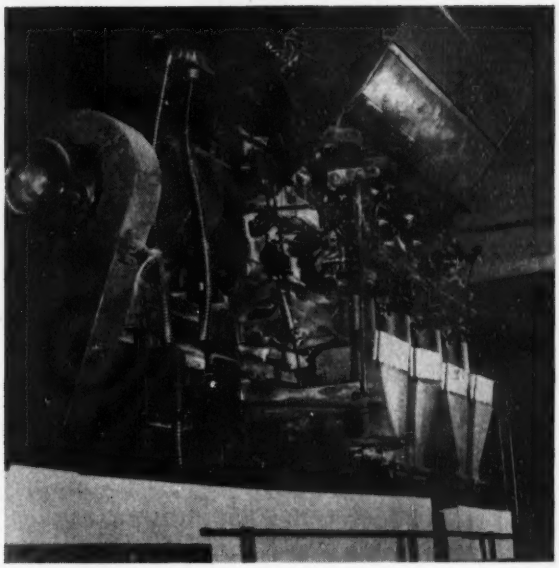
The raw product is conventional extra-grade spray-dried, non-fat milk powder. Specifications for the powder require that it exceed the ADMI extra grade quality. The dried powder, which is purchased from several sources, is received at the Tulare plant in standard fiber drums with polyethylene liners or in multiwall, polyethylene-lined bags.

Each lot of powdered milk has been previously analyzed (before purchasing) at Western Condensing Co.'s central laboratory. It is carefully checked for flavor in addition to the standard tests for moisture and fat contents, sedimentation, solubility index, and bacterial count.

Based on the laboratory analyses, various lots of this powdered milk are first blended in a ribbon-type blender. Exiting from this unit, in a measured flow, the product is air-conveyed to the top of the processing unit. Entering here on a stream of air, the powder is dispersed and, as it falls through this unit by gravity, it is processed and its moisture content adjusted to the desired point.



FROM CARTON forming unit, empties move by belt conveyor to this machine that attaches the pour-spouts. Then they are carried along to the . . .



. . . FILLER UNIT. This is a four-spouter which automatically weighs and fills product into four cartons at once. Portion put in is 10½ oz.

It exits from the processing unit and drops upon a conveyor belt leading to the tray-type dryers. These two unit operations (processing unit and the dryer) are the critical points in the process. The product, when dropping from the processing unit, has attained a fluffy, porous, sponge-like structure.

This is the first unit process in which the physical characteristics of the original raw material is changed. All subsequent unit operations and product handling are devised to gently handle the product to protect its porous structure.

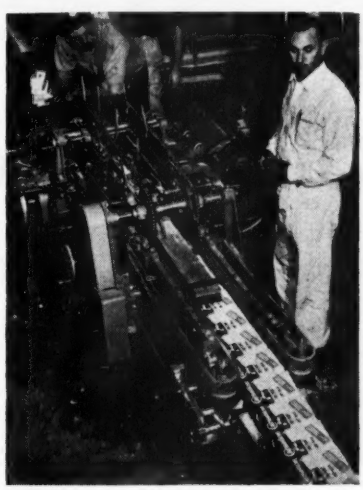
Moisture content of the product is then reduced in tray-type continuous dryers to 3-3.5%, and it is then conveyed to the sizing-screening equipment. After bringing it to desired particle size, it is chuted to polyethylene-lined fiber drums, then placed in temporary storage.

This is the finished product. At this point, it is about one-half as dense as the original "raw" product.

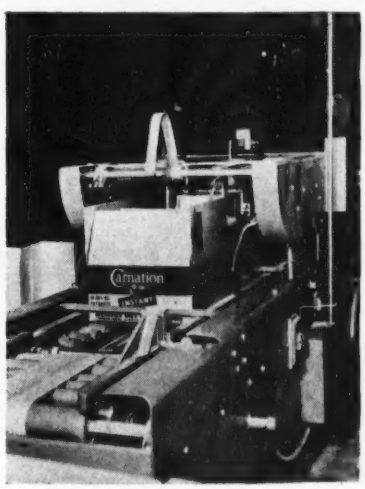
Temporary storage is essential to quality control. A representative sample is removed from each filled drum and, in addition to all the standard tests, is rigidly analyzed for flavor. Also, with a newly devised method, it is tested to determine the product's solubility.

Packaging

The finished product, now in drums, is elevated by a skip-hoist to other screening equipment, then dropped into the automatic filler hopper, ready to be packed.



THEN AFTER passing through compression unit of sealer, filled cartons move through this wrapping machine and subsequently they . . .



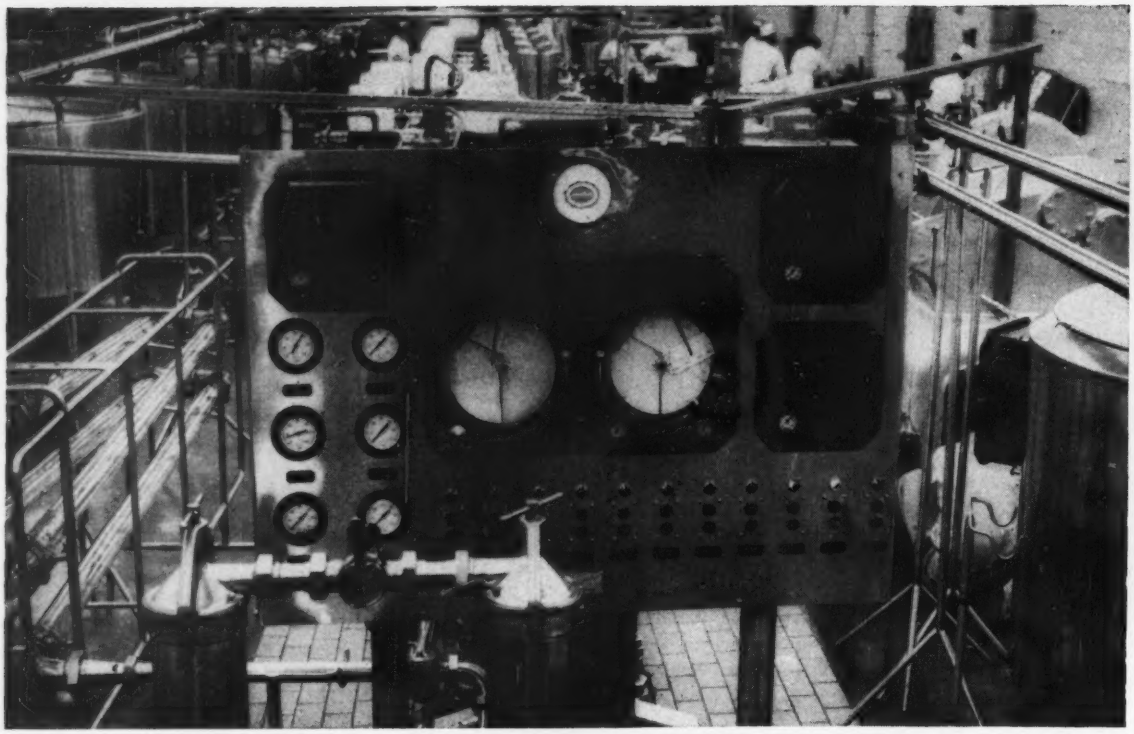
. . . GO INTO CASES (seen here having flaps glued and sealed) that carry 24 packages of Carnation's new milk product.

The carton-forming unit does double-duty. It not only forms the cartons, but following the time that the aluminum pour-spout has been attached and the cartons filled, it then seals the carton lids.

Sequence of packaging is: Blanks are first formed into cartons and bottom flaps are sealed; cartons are conveyed to the machine which attaches the pour-spouts and then move on a conveyor to the four-spout filler. The filler automatically weighs and fills 10½ oz. into each carton, and the containers are conveyed to the sealing section of the carton-making machine.

After sealing, the filled packages pass through a compression unit, which assures a proper seal, and thence, they go to the wrapping machine.

Carnation Instant Milk cartons are blank, the carton label being printed on the cellophane-foil laminated overwrap. Twenty-four, 10½-oz. cartons are manually packed to each case, and cases then are automatically sealed in a case sealer.



PUSHBUTTON PASTEURIZATION of mix at Rieck ice cream plant puts complete 1,500-gph process under central Taylor control—is good prototype for dairy of tomorrow.

New Controls Presage Automatic Dairy Processes

Pushbutton production will come with more functional methods of in-process controls . . . Many of the needed techniques are here in prototype

LLOYD E. SLATER
Business Editor, "Control Engineering," New York, formerly Associate Editor, "Food Engineering"

PROCESS INNOVATIONS now emerging from the pilot stage strongly hint an exciting surge in automatic dairy manufacture.

And control engineers are working on these three fundamental requirements so that this promise may bear fruit:

1. More critical control of process temperatures.

2. Exact regulation of product flow through the plant.

3. Techniques to gage product quality in-stream.

Thanks to the dairy operator himself, prototype techniques to answer these needs of the automatic plant are already in sight. So let us consider each control need—temperature, flow, and quality—in the light of recent process developments. Knowing how these processes rely on control, we then can project the glimmering techniques into the dairy of the future.

I—MORE CRITICAL TEMPERATURE

The prototype safety controls for HTST pasteurization were very well thought out and functionally similar to those we have today. But they literally threw delicate and rather complex instrument techniques before untutored operators. Hence, the needed evolution has mainly been one of ruggedization and operational simplicity rather than basic change. This is evident in today's foolproof, beautifully compacted flow-diversion valve and the recent appearance of twin-case, multi-function instrument units.

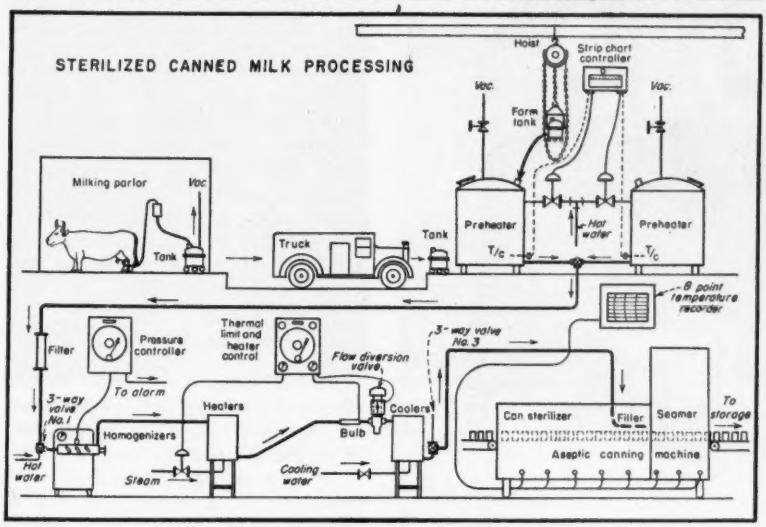
Critical appraisal of early HTST control did stress the importance of speed and accuracy in the system. The flow diversion contact signal had to occur within ½ deg. F. of an exact, critical temperature. And the instrument had to respond to a milk temperature change fast enough to cause diversion within 1 sec.

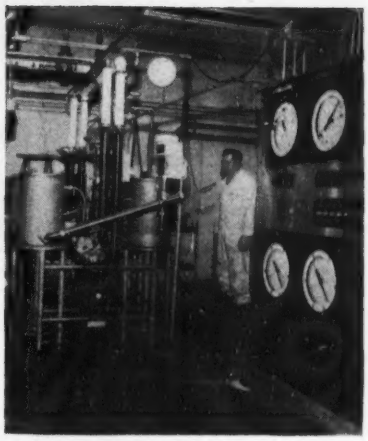
More Positive Approach

In recent years, attention has veered away from the excellent safety system of HTST to a more positive approach to its product temperature control. For if milk in process can be consistently held within ¼ deg. F., diversion need rarely occur.

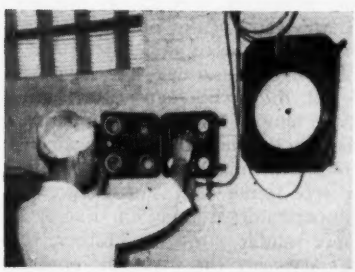
Plate-type heat exchangers have become pretty much standard for HTST

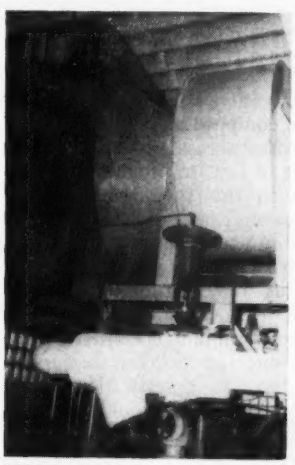
Critical Temperatures Mean New Approaches

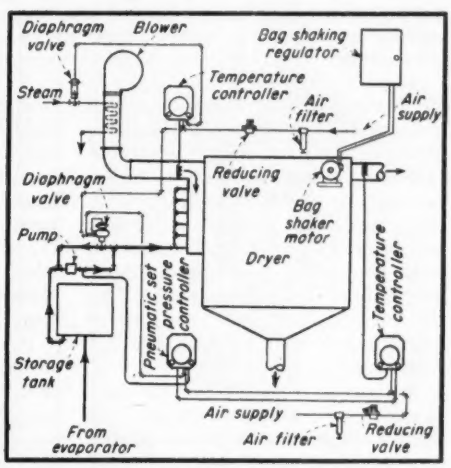




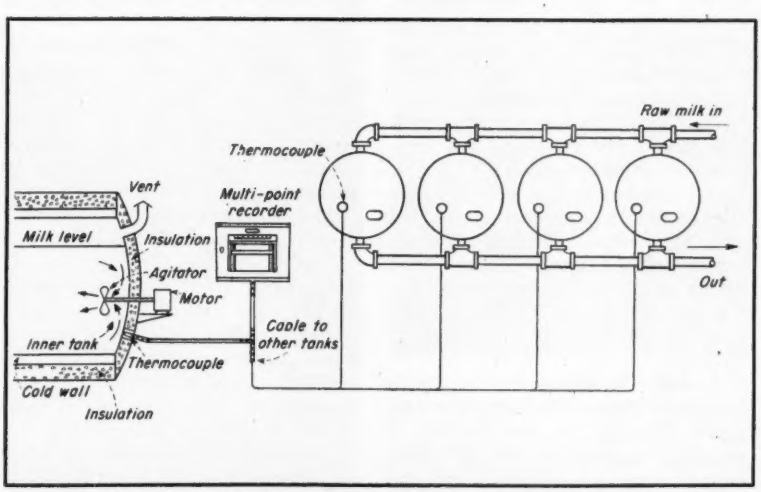
FLASH STERILIZING and aseptic canning need critical temperature control at many points in the line (left). Photo shows barrel heaters, controlled to within ½ deg. at 30 deg. F., in aseptic canning operation.

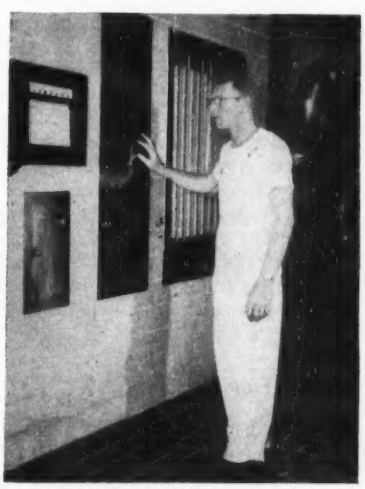




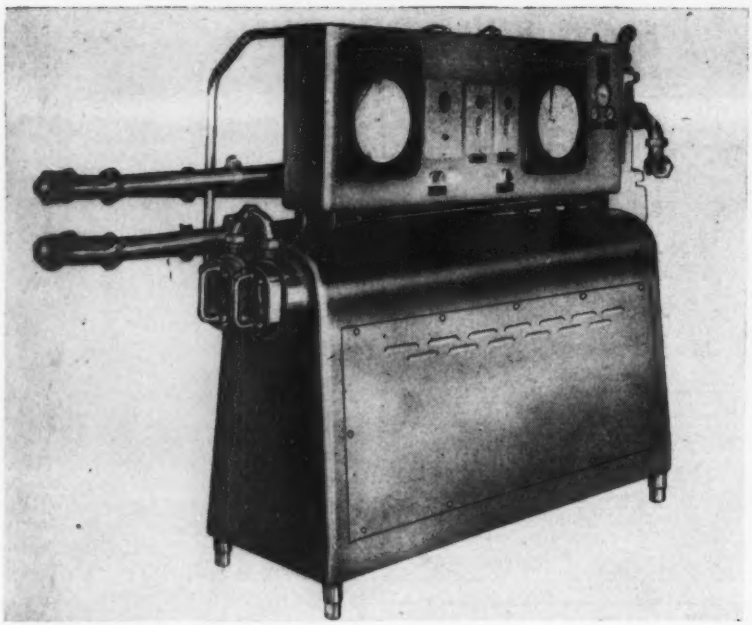


MORE EXACTING control of air to spray dryer (right) upgrades product. Controller (upper left) holds incoming air temperature to 1 deg. F. by throttling steam valve (center). Cycle timer shakes collecting bags (lower left).





IMPORTANCE of stored-product temperature is stressed in this central scanning system at Abbotts Dairy. Multi-point electronic recorder is hooked up to tank-mounted thermocouples. Reads 12 locales on one chart with ¼ deg. accuracy.



INTEGRATED CONTROLS in this new-design high-temperature heater have spurred its success in "flash" sterilizing ice cream mix at over 260 deg. F. Similar innovations will rely on instruments engineered into design.

for this very reason. Using controlled temperature hot water as a heating medium, they are inherently stable. However, imbalances due to steam pressure, or incoming milk temperature, have been enough to require use of automatic reset in the hot water controller. And recently, some have found it advantageous to have the thermal limit milk temperature measurement actually re-set the hot water control.

Application of HTST to other dairy products, such as ice cream mix, has further emphasized need for positive product temperature control. Here, a temperature of 175 F. suggested use of tube-in-shell type heaters with steam as direct heat-transfer medium.

Automatic control of steam-fed tube-in-shell heaters to within ½ deg. F. has been a problem. For one thing, accurate product temperature control systems require that the steam supply be constant in both pressure and quality. But rare is the dairy that does not have sporadic steam-pressure changes and occasional conditions of a superheat. An answer has been to employ a carefully engineered steam-pressure-control system before each tubular heater—with the system often augmented by a desuperheater.

Control From Product

But the basic measure in controlling the steam-fed heater is location of the temperature control bulb directly in the heated product. Naturally, a fast sensing system must be used in this application, and the instrument must be equipped with full throttling and automatic reset capabilities. As a matter of fact, to properly meet exigencies in this type heater, it has been necessary to use rate action in the instrument—a means of control which senses and acts on the rate of change as well as amplitude of any temperature deviation.

Hence, optimum operation of the modern direct steam dairy heater can involve goodly sophistication in its control system and should be based on a cautious engineering study of the thermodynamics of the heater as well as process time constants.

Success in controlling high-temperature heaters has fostered some intriguing new process developments. For one thing, it has opened the way to "flash" sterilizing techniques long argued by many as the ideal thermal treatment for dairy products.

Take the problem of ice cream mix. One large dairy has found that continuous pasteurization at 175 F. for 26 sec., while efficient, does not produce as stable a product as the old vat-hold method. But experiments with a well-instrumented tube-in-shell heater of unique design have taken the mix as high as 260-270 F. with no hold and eliminated the need for stabilizer.

Recent developments in sterile aseptically canned product place even greater emphasis on the function of precision temperature control. Here, vertical annular swirl heaters are used to take product up to 300 F. under high pressure. To obviate burn-on, a "staged" control system is employed, using low- and high-pressure steam. Without this precise control, the heaters would need frequent cleaning, and economic line operation would be impossible.

Precise temperature control is important at many other points in the aseptic line. Container and lid sterilizer temperatures must be maintained. The filler must be held under an exact atmosphere of superheated steam. And all measuring units must provide contact signals to reorient the process flow should conditions fail at any point in the line.

Controlled Solubility

Recent progress in more soluble and functional dry milk products has also stemmed from a new appreciation of precise temperature control.

In spray drying, the engineer's approach to efficient operation was to shove as much hot, dry air through the atomized product as possible. Often the plant operator would proudly announce air temperatures of 1,000 deg. F. and up.

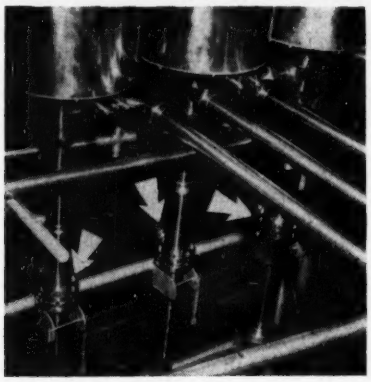
But the technologist, using sensitive temperature test equipment, started to correlate the quality of product with actual drying conditions. It was found that much lower air temperatures—around 500 F.—gave a more soluble powder. Further, that by increasing the drying-air temperature, special degrees of "case hardening" could be built into the product to equip it for such jobs as baking and sauce making.

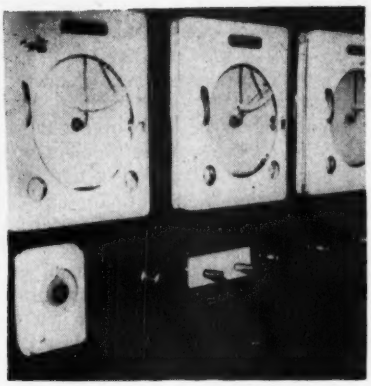
Upshot of this re-evaluation of drying temperature has been the installation of sensitive, adjustable automatic control systems on the hot air make-up to dryers. Also, the trend is toward drying in temperature-regulated stages to give even more positive control of the effect of heat on product character.

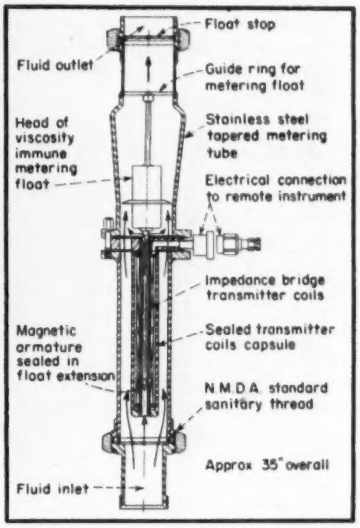
Since temperature developed in the powder itself is really the final arbiter of quality, the writer wonders why processors have not gone to direct product temperature sensing and control of air therefrom. This could be attempted with a sensitive thermocouple or thermister in the collecting product. But perhaps it is being tried somewhere in this active industry.

More accurate temperature measurement has also come into play in storage, cooling, freezing, and ice cream hardening. A few dairies have installed scanning systems that will continuously record up to 16 tanks or vats on a single chart with ¼ deg. F. accuracy. Temperature controls on freezers have been calibrated to 1/20 deg. F. accuracy and have been shown to vastly increase uniformity

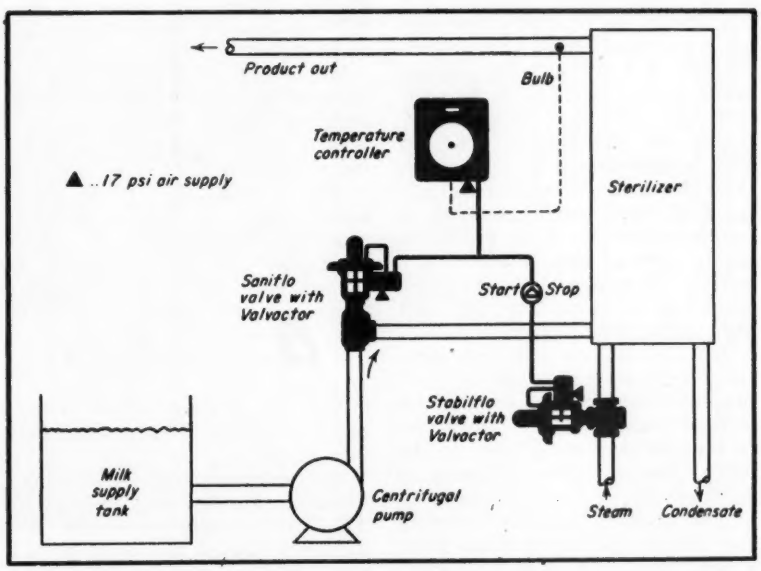
Flow Control Is Clue to Continuous Processes

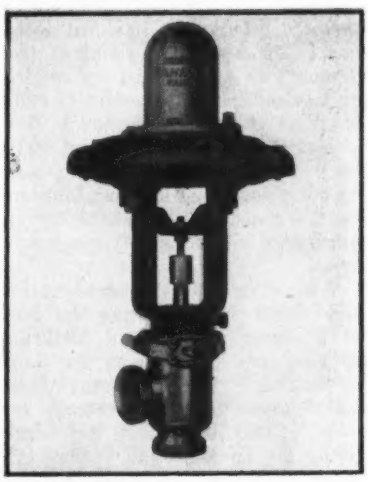




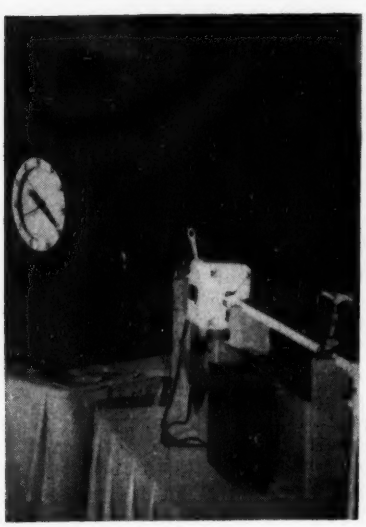

Float stop
Fluid outlet
Guide ring for metering float
Head of viscosity immune metering float
Stainless steel tapered metering tube
Electrical connection to remote instrument
Impedance bridge transmitter coils
Magnetic armature sealed in float extension
Sealed transmitter coils capsule
N.M.D.A. standard sanitary thread
Approx. 35" overall
Fluid inlet

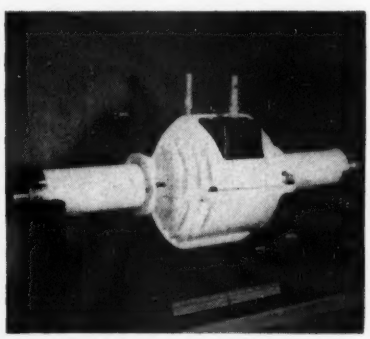
SANITARY ROTAMETERS in ice cream mix ingredient lines at Abbotts give more positive formula control. Instruments (center) automatically cut-off each flow at desired weight. Sketch shows "Flowrator" construction.

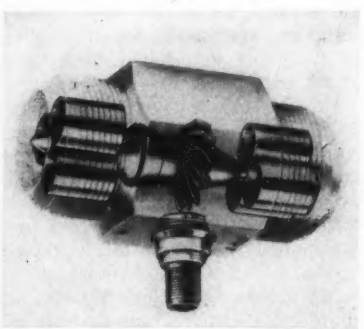




CONTINUOUS FLOW can be controlled with this new sanitary throttling valve. It suggests regulation of product flow through heaters (left).







ELECTRONIC FLOWMETERS of sanitary design, now available for accurate measurement of small flows, are unaffected by such product variables as viscosity and density. Bowser unit (left) and Foxboro meter (center) are electromagnetic types. Product passes through a length of sanitary tube surrounded by an a.c. magnetic field. In flush-mounted electrodes is induced a current linearly proportional to rate of flow. Potter Aeronautical meter (right) develops signal by direct rotation of sanitary "turbine" element in pipe. In model just announced, all curvatures are designed for easy cleaning.

of the operation. Embedded thermocouples in test packages of ice cream are used to permit wall recorders to follow the heat-removal ability of a hardening room.

II—EXACT FLOW REGULATION

The common denominator of continuous dairy processing is flow. And to keep the flow problem in hand, dairy plants have developed an elaborate system of surge and storage tanks and controlled volume pumps to deliver to capacity of each process.

Dairymen got started in this highly developed surge-flow system because of its batch beginnings and because of the "flush" nature of its raw deliveries. But they retained and elaborated on it mainly because of one thing: There simply was no satisfactory sanitary flowmeter around to handle milk.

A few years ago a very likely meter appeared. This is a modified Rotameter consisting of a stainless steel plummet in a flow tube surrounded by an electric coil. Movement of the plummet in direct proportion to flow is picked-up by induction and registered on a calibrated recording unit. And the pounds of flow per hour are then automatically tabulated by an integrating mechanism in the instrument.

Some of its first users seized on this new device for registering the flow of incoming product and totalizing delivery from one part of the plant to another. Dodds Alderny dairy, for example, now flow-accounts for over 125,000 lb. of skim milk daily to its drying plant—and within 1% accuracy (see FE, Jan. '54, p. 40).

Flow Proportioning

Recently, Abbotts Dairies went a step beyond simple accounting with the sanitary Rotameter. It set up an automatic system for formulating or proportioning liquid ingredients into its ice cream mix.

In the Abbotts system, three recording and integrating sanitary Flowrators register the feed of condensed milk, liquid sugar, and fluid milk or water to the mix tank. Flow through these meters is set to a predetermined ratio, and total delivery to the mix tank is determined by a preset timer on the control panel. An additional control action in each instrument stops the proportioning process should any supply flow fall below the desired rate.

But a link was missing in most early users' attempts to capitalize on sanitary flow proportioning and formulating. An accurate sanitary throttling valve was needed to match the precision of measurement and effect control.

True, sanitary control valves had been available. But these were usually on-off or two-position in operation. The flow-diversion valve was an example. Needed was a characterized-type seating plug action that would give varying flow over a range of control signals. The problem was to achieve this throttling action and still have sanitary design.

Two years ago a nicely conceived version of a sanitary throttling valve finally appeared. It employs an expanded, type 18-8 body that conforms to 3-A standards and is attached to its pneumatic operator by a quick-disconnect flange. Its one-piece plunger is hand-nut connected to the operator shaft, and gaskets or stuffing boxes are eliminated by O-ring seals between the bonnet and stem, as well as body and bonnet. The plug end of the plunger has a modified parabolic design which permits linear flow for proportional control. It is now available in 1-to-3 in. sizes and can withstand line pressures of from 100 to 45 psi., according to size.

Uses for the sanitary throttling valve in dairy control are just starting to be plumbed. Teamed with a sanitary flow meter, it will proportion an ingredient to a process or exactly control the flow of milk through a pasteurizer. This latter ability may prove interesting to those who are beset with holding-time problems.

Teamed with a temperature measuring instrument, the sanitary throttling valve may bring a new look to thermal process control. Thus, flow to a heater may be matched to the unit's changing thermodynamics—as evidenced by its measured ability to heat the product. Similarly, throttling flow control of product feed may prove a more positive approach to continuous standardization of pH and butterfat content.

Electronic Pick-Ups

One of dairy's big objections to conventional flow metering was either the presence of complicated moving parts in the device or the need for product isolating designs such as diaphragms or stuffing boxes. The Flowrater met these with its relatively simple plummet and induction-type pick-up. However, the search for new, simple approaches still went on.

One highly interesting possibility was an electromagnetic method for measuring the flow of blood. This was developed by Kolin in the '30's. By surrounding intact arteries with an electromagnetic field and contacting the arterial walls with two electrodes, he observed an induced e.m.f. across the electrodes which was proportional to flow.

After the war, Kolin's principle was further developed for industry. There was designed a simple, straight-through pipe section surrounded by a electromagnet and with two flush mounted electrodes around its center section. In line with the electrodes was a high-impedance input amplifier with good linearity characteristics to match the linear flow signal developed. This, in turn, was connected to an electronic recorder-controller.

The obvious dairy appeal of this new metering system was its complete lack of moving parts and unbelievable pipe-like simplicity, allowing in-place cleaning. Further, the device appeared very sensitive to low flows, while being unaffected by any change in the product such as density, viscosity, and even conductivity.

In 1949, one of the first experimental sanitary flowmeters of this type was installed at Cornell for test on milk.

Last year the company which cooperated in this pioneer test finally came out with a complete, packaged sanitary design. This now is being installed in dairies.

This very fall one of the well-known dairy instrument firms is readying its electromagnetic flowmeter for in-plant use. It will be available in sizes from 2 to 8 in., and its recorder will read directly in units of flow. Makers of the new unit claim that it offers less than 1% error from maximum down to zero flow, and produces no pressure drop other than that imposed by a pipe equal to meter tube length.

Still another sanitary electronic flowmeter has just been announced. This is a turbine-type meter that gages flow through the movement of a rotor inside a pipe. A small permanent magnet inside this rotor induces an alternating current in an external pick-up coil. This induced current is directly proportional to velocity of flow.

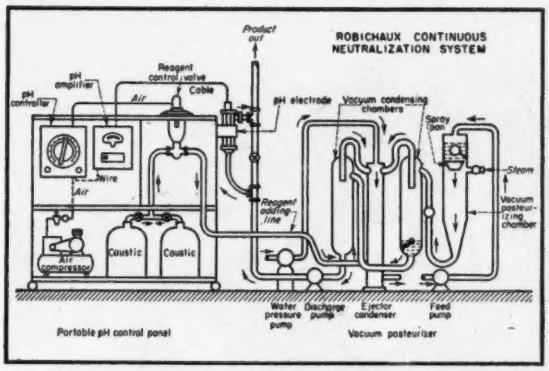
One interesting advantage of the turbine-type unit is that it produces pulses that can directly feed into an electronic counter for total volume rather than rate control. This eliminates the error of instrument totalizing and suggests teardrop accuracy in formulating and feed-in control. The system also converts for normal rate measurements.

III—GAGING QUALITY IN-STREAM

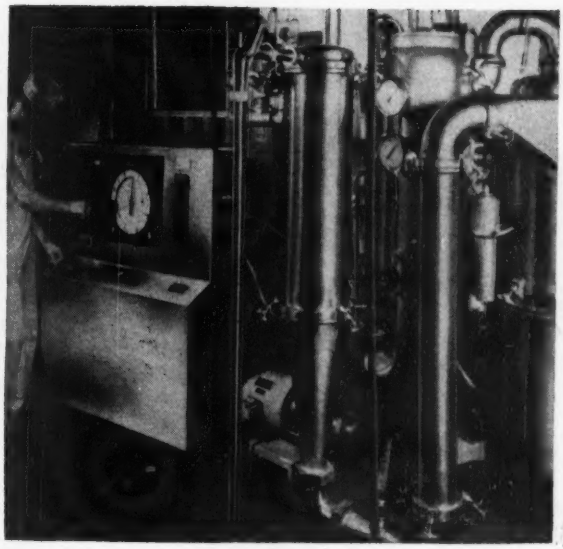
What is urgently needed are techniques and devices that will measure properties of the product on a con-

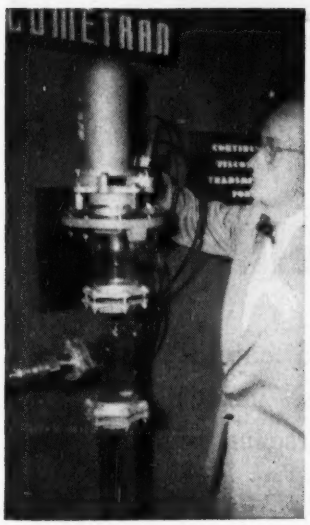
(Turn to page 163)

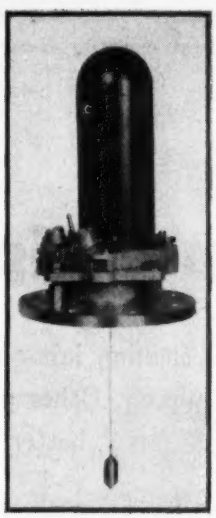
Quality Control In the Line

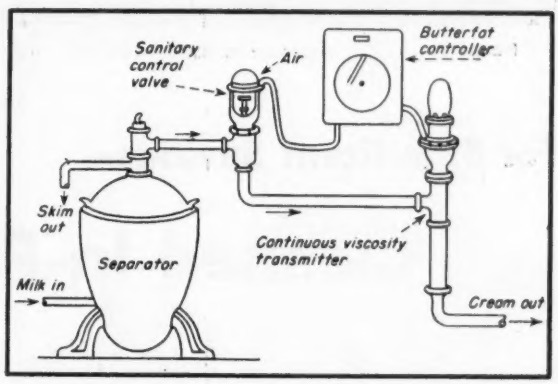


AUTOMATIC NEUTRALIZATION of cream is possible on continuous basis with Robichaux system. In-stream pH pick-up measures outgoing cream from Vacreator, and controller injects needed amount of neutralizer through valve in vacuum chamber.

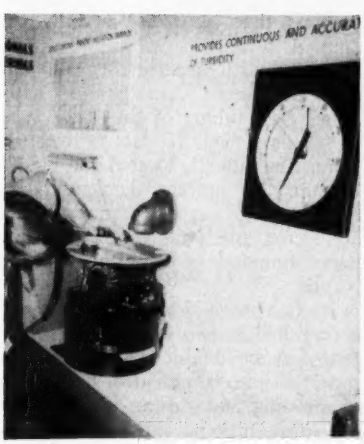


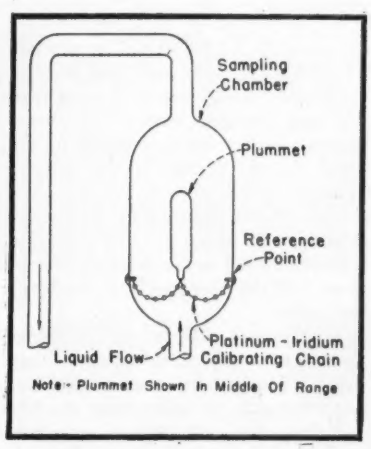




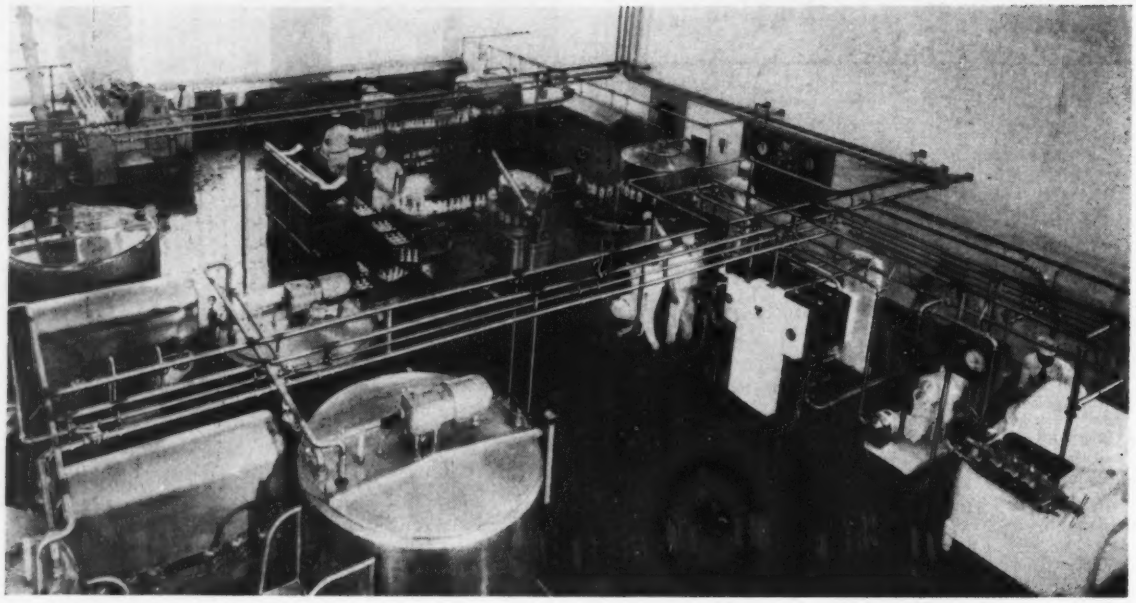


BUTTERFAT CONTENT of cream is continuously controlled in this system, now under pilot test. Temperature-compensated Brookfield viscosimeter (left and center) teamed with Foxboro controller measures cream from separator, throttles outlet valve to hold butterfat within a claimed 0.1%.





QUALITY GAGING tools with good potential for milk products are under constant development. At left is a continuous turbidimeter by General Electric. It tabs amount of suspended particles in liquids by their light beam dispersion. In Ohmart unit (center), gamma rays are passed through product to judge its density or structure. At right is very sensitive buoyancy-type density pick-up made by Precision Thermometer Co. The position of the plummet in the chamber of this instrument is detected by an induction coil to measure density.



RECIRCULATION cleaning; in dairies like this, brings large monetary savings over take-down installations.

For Significant Savings—

Cleaned-In-Place Pipelines

They cost less to install, require less cleanup labor and materials, and have longer useful life than take-down piping. Other pluses include lower bacteria counts, improved operating efficiency, better personnel relations

R. F. HOLLAND

Professor of Dairy Industry, Cornell University, Ithaca, N. Y.

IN-PLACE CLEANING of sanitary pipelines in milk and food plants—extensively recognized as a most feasible and desirable practice for several years—now has been included in the latest U. S. Public Health Service Code.

Still, much research in both engineering and chemical fields is continuing, aimed at improving the fittings and the cleaning and sterilizing materials.

Pipe joints, gasketed or otherwise, though reasonably satisfactory, remain possible sources of contamination. But improvements are being made steadily.

Equipment and materials presently available, however, are sufficiently satisfactory that no processor should hesitate to install CIP lines for fear that future improvements may make the present installation obsolete. For he stands to gain a number of benefits by such an installation:

- **Money is saved by using lighter, less expensive tubing.**
- **Cleanup labor may be cut as much as 25%.**
- **Expenditures for cleaning materials, brushes, etc., are reduced.**
- **Bacteria counts, especially *E. coli*, drop substantially.**
- **Pumps and homogenizers operate more efficiently due to elimination of air leaks in suction lines.**
- **Personnel relations are improved, and**
- **Plant is neater appearing.**

Time and motion studies have demonstrated that, in general, it is uneconomical to attempt to clean, in-place, any lines that are less than 50 ft. in length. Only exception is where these lines may be included in the system of a high-temperature short-time pasteurizer or other equipment that is normally cleaned by recirculation or flush methods.

General arrangement of the plant, type of product handled, and arrangement of equipment are other considerations that must be carefully examined.

Most health departments will permit permanent installations with either glass tubing of the Pyrex type or stainless steel. If glass is selected, it must be properly located and rigidly mounted to prevent damage. However, breakage has not been a significant factor, and some companies have many thousands of feet of glass tubing in use.

Recirculatory cleaning may be accomplished in two ways: (1) The system may be double-piped so that a separate line is provided for return of cleaning and rinsing solutions, or (2) Lines may be interconnected in such a way that the solutions are eventually brought back to the solution tank.

Single runs of pipe sometimes are cleaned by the reverse flush method.

In this system, solutions are pumped from a tank at one end of the line to another one at the other end. After the first tank is emptied procedure is automatically reversed, the solution flowing in the opposite direction either by gravity or through use of another pump.

Because the reverse flush system of cleaning is much more commonly used on farms than in processing plants, no further reference will be made to it. The following discussion will deal with recirculatory cleaning only.

Many Fittings Available

Stainless steel sanitary pipe may be adapted to CIP in new installations by application of special types of ferrules designed to accommodate permanent gaskets. Ferrules of this type are shown in Figs. 1 and 2. Fittings and gaskets for Pyrex piping are shown in Fig. 3.

Modifications of ordinary 3-A sanitary fittings have also been made so that present pipelines may be adapted to CIP. When additional lines are installed, the new fittings can likewise be adapted so that it will not be necessary to maintain a large supply of different types of gaskets. One such modification, the Tri-Groove developed by the Tri-Clover Division, Ladish Co., is shown in Fig. 4. Another, the John Perry fittings and gasket can also be applied to the modified 3-A standard fittings. (See Fig. 5.)

Gaskets of Hycar, Neoprene, Teflon, and various combinations seem to be reasonably satisfactory for most installations. However, work has been steadily in progress to obtain more satisfactory compositions and designs for in-place cleaning. Such gaskets must be non-toxic, non-absorbent and fat resistant, and should be flush with the inner surface of the pipe.

Some plants have chosen to eliminate the gasketed joint through the use of all-welded stainless steel lines. Where smooth welded joints have been obtained and where equipment is located with reasonable permanence these lines have performed well.

Lines Must Drain Fully

In the early application of in-place cleaning it was considered that lines should have a slope of not less than ¼ in. per ft. so that reasonably complete drainage might be attained. Experience has shown, however, that this is not necessary and many lines are in use that are almost horizontal. Slope recommendations of 1 in. in 8 ft. to 1 in. in 20 ft. are now common. In any event, there must be no sags or low spots in the lines and they must drain reasonably well.

All lines in a recirculatory system must be of sanitary construction. Use of galvanized iron pipe or hose for a return line is not permitted by most departments of health.

Requirements as to the size of solution tanks vary considerably. In general, however, it is considered that a tank is satisfactory if it is of such size that the suction side of the pump shall be submerged 18 in. when the circuit is full. Both the solution tank and the circulating pump should be constructed of non-corrodable material.

The recommendation is usually made that the pump have sufficient capacity to maintain a flow rate of at least 5 fps. in the largest pipe in the circuit. An accompanying table gives volume of flow required to obtain such a flow rate in the various sizes of pipe.

Some departments of health and many plant operators consider it advisable that a recording thermometer be installed at the end of the return line so that a continuous record of solution temperatures is available. Temperature controllers also are sometimes installed at solution tanks. Fig. 6 shows the Cherry-Burrell circulating unit especially developed for CIP lines.

Cleaning Procedure

Recirculatory cleaning involves the same fundamental procedures that are recognized as essential for manual cleaning of diary equipment. These are: Clean water rinse, cleaning solution wash, and sanitizing.

In applying CIP, it is sometimes feasible and desirable to utilize two

New Fittings Speed CIP Conversion

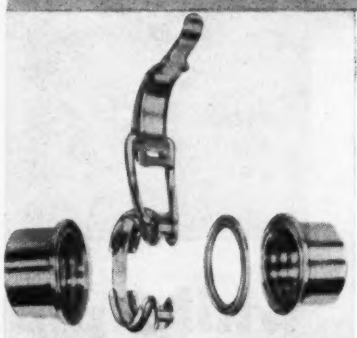


FIG. 1. Tri-Clamp fitting comprises expanding ferrules, molded gasket, snap action clamp. (Ladish Co.)

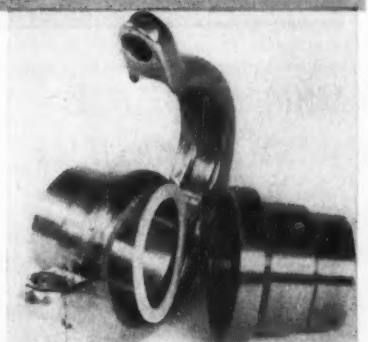


FIG. 2. Cherry-Burrell fittings use self-centering Teflon gasket in a female ferrule.

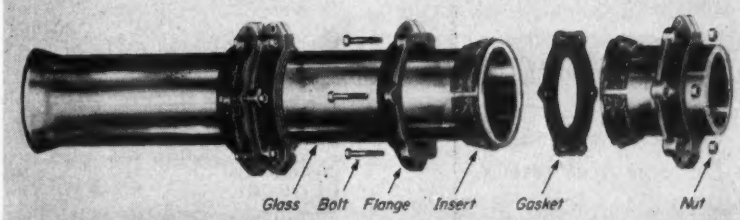
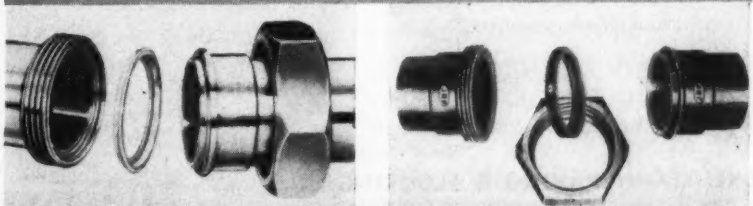


FIG. 3. Pyrex tubing is joined with special flanges. Gasket is centered between ends of glass by flange bolts.



FIGS. 4 & 5. Standard 3-A fittings may be adapted to CIP by use of special tools and gaskets. Left: Tri-Groove converted fittings and gasket. Right: John Perry combination.

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or three cleaning circuits. These might be: (1) Cold raw milk lines, (2) hot milk lines and high-temperature short-time unit, and (3) cold pasteurized milk lines. Latter may often be cleaned in conjunction with the HTST unit and hot milk lines.

Systems should be flushed immediately after use with cold or lukewarm water until the water runs clear. Rinse water should not be recirculated but should be discharged to a drain.

No Universal Cleaner

Type of cleaner to be used will vary with: (1) Characteristics of water supply, (2) type of soil present, and (3) temperature of milk or milk products handled. Lines handling hot or viscous products are in general more difficult to clean than those handling cold milk.

Since above factors will vary widely between plants, it is not possible to set up recommendations that will cope with all conditions. Where water supplies are soft it may be possible to clean cold milk lines by the recirculation of alkaline cleaners only. In other instances daily use of both acid and alkaline cleaners may be necessary to prevent formation of milkstone.

Frequently acid cleaners need be used only once or twice each week, and often they replace the alkaline cleaners at these times. However, in cleaning hot milk lines and HTST equipment, use of both acid and alkaline cleaners is practically mandatory.

Volume of cleaner solution should be such that when the recirculatory line is completely filled sufficient remains in the solution tank to completely submerge suction line of pump so that no air is incorporated. It has been found helpful to add 4 oz. of 15% chlorine solution to each 30 gal. of alkaline cleaner. All equipment, such as valves and dead-ends longer than 1½ times diameter of the pipe, must be cleaned manually.

Sanitizing may be accomplished by use of hot water or chemical solutions. If hot water is used, temperature must be maintained at 180 deg. F. or above at discharge end of system for at least 5 min. for satisfactory results. If chemical sterilization is employed, line should be flushed after washing operation with clean water, and sanitizing should be left until just before the line is used.

In no case should a strong chlorine solution be left in contact with stainless steel lines for longer than 15 min. A compound should be chosen in which the chlorine is completely available. All of the salts must go into solution so that they can be flushed away, otherwise a film is likely to be formed which may cause pit-type corrosion. In general, chlorine is to be preferred to quaternary ammonium compounds, since most of the latter tend to deposit on the surface of the lines.

HANDY FLOW-RATE TABLE

You Don't Need a Meter to Determine Velocity of Liquid Through Pipes. When 10-Gal. Can Is Filled in Time Shown, Liquid Rate in Pipeline is 5 Fps., Required for Good Cleaning

Pipe Size (Inches)	Flow-Rate (Gpm.)	Time to Fill 10-Gal. Can (Seconds)
Stainless Tubing		
1	10	60
1½	24	25
2	43	14
2½	69	9
3	101	6
4	180	3.5
Glass Pipe		
1½	27½	22
2	49	12.5
3	110	5.5
4	196	3

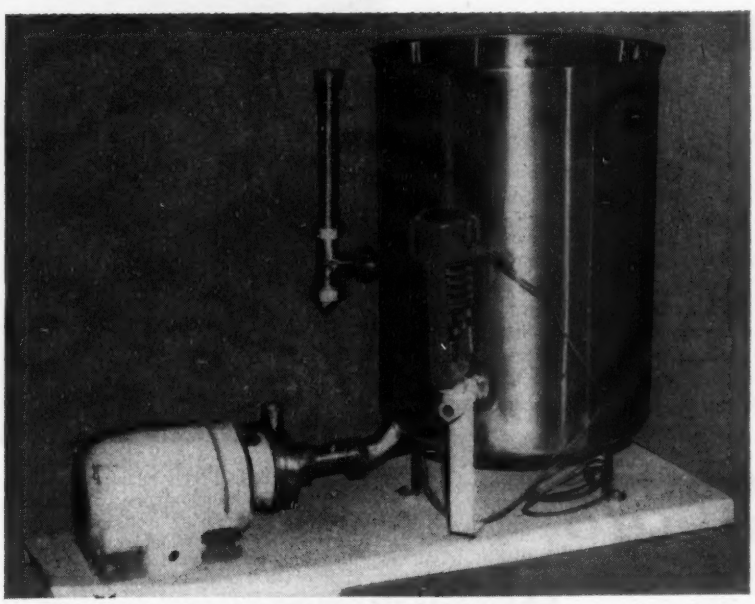

FIG. 6. Portable CIP circulating unit comprises 50-gal. solution tank, automatic temperature control, circulating pump on 3-wheel base.

Advantages of CIP

Most benefits of CIP relate to reduced costs. One company reports total man-hour savings in one of its large plants at 900 hr. per week and in another 600 hr. These savings become increasingly significant in these times of high labor costs and declining prices.

Significant savings also are reported in the cost of cleaning materials. These apply to expenditures for brushes, cleaning compounds, pipe cleaning equipment, etc. One plant reports a reduction of $135 per month in the cost of cleaning compounds alone.

Considerable savings can be made in the cost of the lines themselves, since it is possible to use lighter and less expensive steel tubing. CIP lines also have a much longer useful life because of elimination of damage normally experienced in take-down lines through the battering of pipe and fittings in wash sinks and during take-down and reassembly.

Plants that have adopted in-place cleaning and permanent pipe lines have reported significant reductions in the bacterial counts of their products. These undoubtedly are attributable to the elimination of contamination after the lines have been sterilized through attempts to insert new gaskets to stop leaks and so forth. Losses through leaking unions are also eliminated.

CIP installations are of a distinct advantage on the suction side of pumps and homogenizers, since the gaskets seal tightly and reduce air incorporation.

Personnel relations in CIP plants are likewise improved, and the cleanup man becomes something of an engineer rather than simply the operator of a scrub brush. CIP is a great help in eliminating the messy, wet floors and uniforms common in plants where pipe take-down cleaning methods are practiced.

Plants using CIP are neater in appearance, not only because of this reduction in wetness but also because lines can be mounted where they are out of the way and hence do not block either vision or traffic.

A TASTY BUT DISTRESSING PROBLEM

Felber Biscuit Company in the process of spraying hot cocoanut oil on their delicious Town House crackers, acquired an unwelcome oil mist problem. A fan exhaust system—installed to clear the air—wasted gallons of costly cocoanut oil and created a dangerous fire threat.

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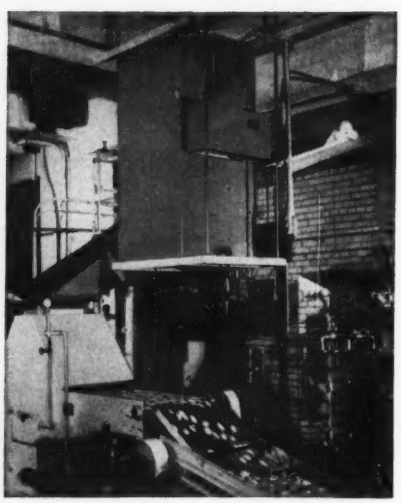
Excess oil mist is now drawn into a Westinghouse PRECIPITRON and out of the air completely. Result: mist, mess and fire hazard have disappeared. Valuable cocoanut oil is now salvaged for re-use. Employee working conditions are greatly improved.

Perhaps Westinghouse PRECIPITRON can draw savings out of the air for *you*. There is a PRECIPITRON for every application for removing contaminants from the air. For an answer to *your* specific air cleaning problem . . . call your nearest Westinghouse-Sturtevant office today. Or write to Sturtevant Division, Westinghouse Electric Corporation, Hyde Park, Boston 36, Mass.



Westinghouse PRECIPITRON suspended directly over the hot cocoanut oil spray collects excess oil mist from the spraying operation. Clean air is returned to the room; valuable oil is reclaimed.

WESTINGHOUSE AIR HANDLING

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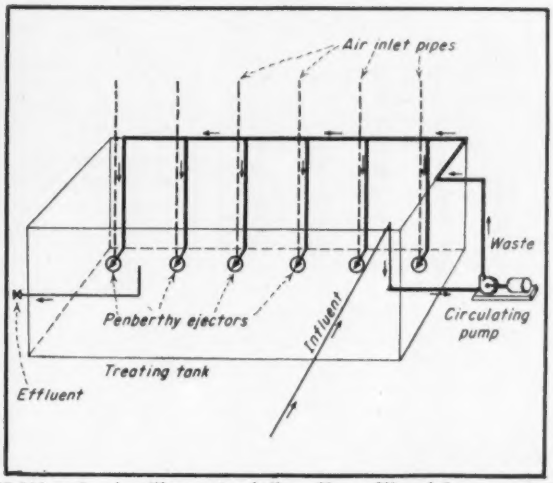

TREATING PLANT at Port Murray Dairy now handles 25,000 gal. of milk waste daily. Uses fill-and-draw system employing two 25-hp. circulating pumps—one running 8 hr. other 16. Requires less than 30 min. attention.

Big Problem: *Dairy Wastes* Striking Solution: *Bio-Oxidation*

System employing acclimated culture under aerobic conditions and high-velocity recirculation eliminates sludge, gives clear low BOD effluent

R. RUPERT KOUNTZ

Professor of Sanitary Engineering, The Pennsylvania State University, State College, Pa.

DISPOSAL of dairy wastes, a problem that has brought many sleepless nights to operators of country dairy plants in recent years, no longer worries management of Port Murray Dairy Co., Port Murray, N. J.—thanks to research at ERRL and pilot plant studies at The Pennsylvania State University.

For, on April 12 of this year, the company's old chemical treating plant, which had proved far from satisfactory for handling wastes from the 70,000 qt. per day operation, was converted to a new system.

In the intervening months, the new installation has exceeded all expectations with its trouble-free operation. In addition, it has—

1. Reduced labor more than 90%. Previously, 16 man-hours were consumed weekly in removing accumulated sludge, but now there is no final sludge to be removed.

2. Completely eliminated need for chemicals.

3. Cut BOD of effluent more than 95%, allowing direct disposal to an adjoining stream without creating a nuisance.

Employed in the system is bio-oxidation, a technique of applied microbiology utilizing the biochemical oxidizing ability of an acclimated culture under aerobic condition.

Its application to dairy wastes *is not new*, but a treatment plant employing design values based on biological data *is new*. Before the pilot plant was built at Penn State, theory and design data were known, and established waste treatment inhibitions were ignored.

7-Year Study Involved

Hoover, *et al*, at ERRL, had determined by laboratory studies that one pound of milk solids required 0.45 lb. of dissolved oxygen for its complete assimilation into bacterial cells. However, total amount of oxygen actually needed for 1 lb. of milk solids is 1.2 lb. Inadequate quantities and rates of dissolved oxygen supply are main reasons for unsatisfactory operation of many milk waste treatment plants today.

Once the milk solids are absorbed on the bacteria, their assimilation into new cells proceeds at a rate dependent only on temperature. But absorption and assimilation processes are most efficient when maximum surface is available per weight of bacteria. Surface can be enhanced by means of high-velocity hydraulic shear devices, such as centrifugal pumps and high-velocity nozzles. Contrary to popular beliefs this shear does not affect settling or coagulation of the cells.

To produce efficient, economical treatment rapidly it is necessary to have a high concentration of bacterial cells and an adequate supply of dissolved oxygen.

In either continuous or fill-and-draw treatment, it must be possible to separate the bacterial cells by gravity sedimentation and thus yield a clear effluent.

Work at the university pilot plant and that now going on at Harrington Dairy Co., Dushore, Pa., as well as observations of existing plants, dictates the preferred use of a fill-and-draw

or batch type of treatment whenever possible. Operation is simpler and effluent is of consistently higher quality due to absence of bacterial cells or sludge.

Size of plant is determined by the compacted volume of cells and incompressibility of water. The pilot plant operation showed the "sludge index" to lie between 40 and 50. This means that, when settled for 30 min., 1 lb. of cells occupies 0.8 cu. ft. This value allows a "clear liquid depth" to be selected for the sedimentation process, and upon this depth depends the entire size of the treatment plant.

Total weight of cells is a fixed amount because a unit weight of milk solids produces half its weight in new cells. Pilot plant data show these cells (both old and new) to be oxidized endogenously at the rate of 1% per hour, or 20% per day at 90 deg. F. This means that total weight of cells is equal to 2.5 times average weight of milk solids received per day.

How to Figure Plant Size

Assume a dairy plant handling 100,000 lb. per day that loses 2.5% of milk received, or 2,500 lb. Also assume a total waste volume of 25,000 gal. in 8 hr., or an average flow of 50 gpm. Daily loss of 2,500 lb. of milk corresponds to an equilibrium total cell weight of 750 lb. in the treatment system.

Treatment tank size is based on compacted cells volume and amount of waste to be treated per day. Cells (750 lb.) occupy 600 cu. ft. when settled. This volume, plus 1 ft. of freeboard (to prevent entrainment when draining), is the sedimentation portion of the tank, which will be assumed as 1,200 cu. ft. To this is added volume of the day's waste, namely 3,330 cu. ft., giving a total tank size of 4,530 cu. ft., or 34,000 gal. Effluent pipe is located at the 9,000-gal. level in the tank.

Typical Operating Data
(Port Murray Dairy Co.)

Waste volume (8 hr.)	25,000 gal.
BOD of influent	1,660 ppm.
BOD of effluent	72 ppm.
BOD reduction	95.7%
Tank volume	37,500 gal.
Sludge volume	20-30%
Sludge concentration	5,500 ppm.
Normal temperature	86 deg. F.
Dissolved oxygen	0.6-3.5 ppm.

In this type plant oxygen supply is suspended for 6 hr. to allow cells to settle and the 25,000 gal. of clear supernatant to drain out. Contrary to present ideas and opinions, bacterial flora are not harmed by this 6-hr. period without oxygen being supplied.

Calculating Oxygen Demand

Having thus calculated the volume of the treatment plant, the only remaining item is the supply of dissolved oxygen. Rate for endogenous oxidation is uniform and is determined from weight of cells oxidized per hour. In this case, 150 lb. are oxidized per day, an amount which will require 9.4 lb. dissolved oxygen per hour.

Assimilation phase is based on a milk loss of 315 lb. (37.5 lb. milk solids per hour), which will require dissolved oxygen at the rate of 17 lb. per hr. During the 8 hr. waste flow, dissolved oxygen must be supplied at the rate of 26.4 lb. per hr., and during the remaining time at a rate of 9.4 lb. per hr. It is important that the excess air supply be stopped when the waste flow ceases, otherwise foaming problems will be encountered.

Work is now in progress involving "delayed aeration", which will permit the power requirements of the oxygen supply system to be postponed until after the major activities in the dairy are completed. Preliminary results are quite favorable to this plan.

It is intentional that quantities or rates of air have not been mentioned, as they have little meaning unless the type of air dispersing device is known. Studies in this research project have shown available devices to vary between 2 and 25% efficiency in dissolving the oxygen in a given volume of air.

Experiments and pilot plant data have shown a water ejector designed for steam operation to have a high efficiency, to be free from clogging, and to prevent bacterial clumping by its hydraulic-shear action. Possible criticisms of a high power rate can be more than offset by the negligible maintenance and the simplicity and economy of the fill-and-draw type of treatment unit.

For the treatment plants described above, oxygen supply has been furnished by means of ejectors manufactured by the Penberthy Co., Detroit, whose cooperation in supplying various units for testing contributed greatly to the final results. Ejector found most satisfactory was the XL-96 type, size 7A (steam nozzle), which is rated according to: Lb. oxygen/hr. $= 0.165\ V^{2.85}$, where V is the nozzle flow in cfs. divided by the nozzle diameter in feet.

This rate of dissolved oxygen supply is for aspiration from the atmosphere. Supply of air by means of a blower at a rate equal to two times the water flow will increase the dissolved oxygen supplied by 50%.

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1. *Sewage and Industrial Wastes*, Vol. 22, No. 3, 318-24, Mar. 1950.
2. *Ibid.*, Vol. 22, No. 7, 888-92, July, 1950.
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4. *Ibid.*, Vol. 24, No. 3, 306-12, Mar., 1952.
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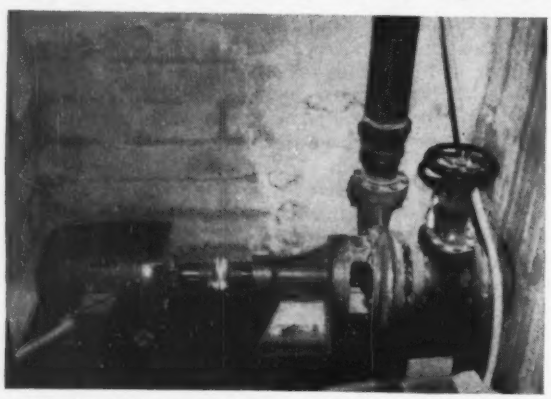
7. *Ibid.*, Vol. 25, No. 2, 201-06, Feb., 1953.

Recirculation Through Steam Ejectors Catalyzes Process



CENTRIFUGAL pump forces waste through high-velocity nozzles to incorporate air, increase bacteria surface.

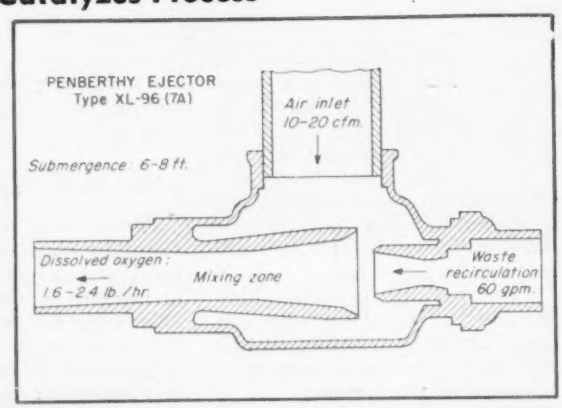
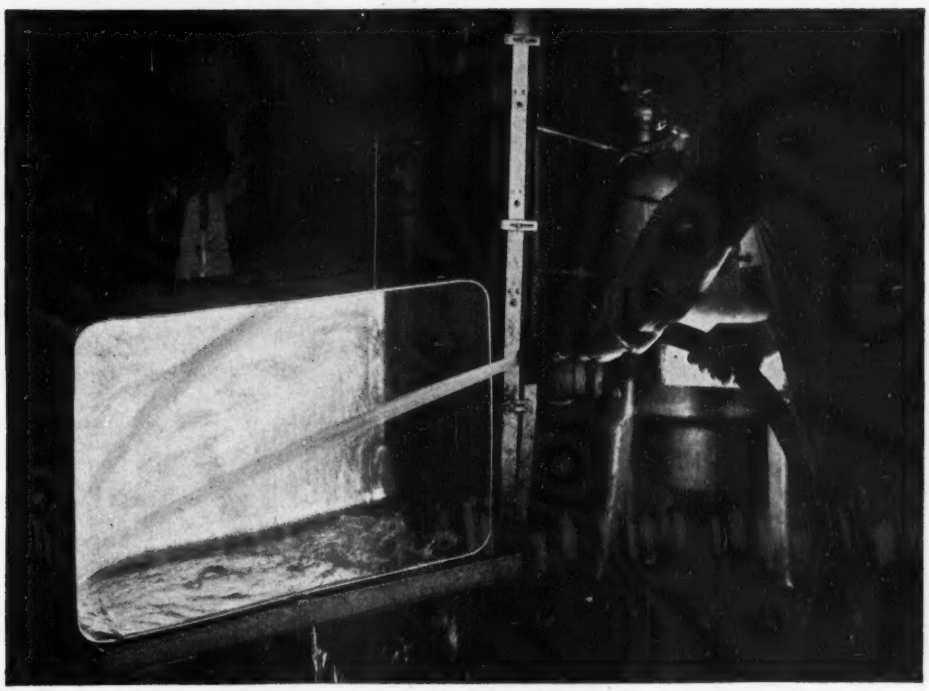


DIAGRAM of Penberthy ejector shows method of mixing air with recirculated waste to attain maximum aeration.



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The ease with which this ENDURO Stainless Steel meat products container is cleaned will interest everyone who operates metal equipment. A warm water rinse usually restores ENDURO surfaces to sparkling cleanliness. Occasionally, some more stubborn materials may require brushing or the use of stronger cleaning compounds. Not often, though.

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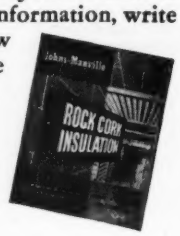

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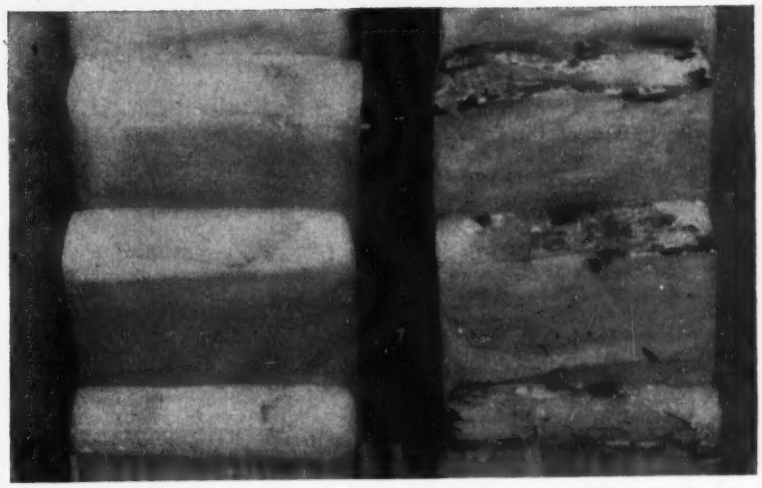


EFFECTIVENESS of treated wrappers in preventing mold growth on cheese is demonstrated in 10-week storage test. Left: Wrapper coated with dimethyl dichlorosuccinate-containing preparation. Right: Wrapper untreated.

CHEESE KEEPS LONGER In *Antimycotic* Wrapper

Vapors from product inhibit mold growth on surface without transfer to cheese . . . Protect flavor, color, and appearance during storage

LABORATORY AND "PILOT" PLANT trials have demonstrated important advantages to cheese packagers through use of a wrapper additive–dimethyl dichlorosuccinate.

Thus, these salient results are achieved:–

1. Shelf-life of consumer packaged cheese is substantially increased.

2. Loss of product due to invasion by mold is reduced during the ripening and display periods.

3. Flavor, color, and appearance are maintained during storage, distribution, and display.

Present demand for cheese packaged in small consumer units has intensified the problem of mold development on surface of the product. In spite of exacting sanitary measures, and extensive efforts to package mold-free cheese, a certain portion contains spores or comes into contact with them during packaging.

Problem of loss due to mold growth has long been recognized by the cheese industry, and efforts to minimize it, by addition of substances such as calcium propionate[1,2] or sorbic acid[3] to the product or its surface, or by adding dehydroacetic acid to wrappers,[4] are a matter of record.

After several years of experimentation, the idea of adding to the cheese wrapper a small amount of an antimycotic agent, which could inhibit mold growth on the cheese surface, without contamination of the product,* was introduced[5,6,7].

Subsequent investigations in the Kraft Food Laboratories have demonstrated conclusively that as little as 3/10% dimethyl dichlorosuccinate, incorporated in wrapper coating materials, will effectively and markedly reduce mold growth on the cheese surface. Antimycotic that gets into the product by this process is negligible and amounts to only a few ppm. in the cheese surface.

Experiment Supply Answers

The question, "What will dimethyl dichlorosuccinate do?" can best be answered by consideration of some carefully controlled wrapping experiments.

In one such series, Parakote-type wrappers,* containing 0.45% dimethyl dichlorosuccinate in the coating preparation** were applied to ½ lb. packages of sliced process American cheese. Wrapping was with Hudson-Sharp machinery, operated by plant personnel. Cheese was entirely mold-free, that is, the ½-lb. portions, cut from 40-lb. blocks, had no visible surface mold growth. Cheese thus packaged and a set of control portions similarly packaged in wrappers without antimycotic were placed in shipping cartons and stored at 45 deg. F.

Samples were removed periodically and inspected. When mold spots appeared they were marked and the packages returned to original carton, so that accumulative mold development on a single series of packages could be determined. Some results of this experiment are shown in Table I, and presented graphically in Figs. 1 and 2.

Flavor, color, and appearance of cheese in treated wrappers after 12 weeks were excellent and incidence of mold growth was only 1%, as compared to 32% on same product wrapped under identical conditions but without dimethyl dichlorosuccinate.

In case of New York sharp American cheese, flavor, color and appearance likewise were excellent, and incidence of mold growth only 4%, as compared to 22% on the product in untreated wrappers. This may well indicate minimum benefit assignable to dimethyl dichlorosuccinate, since carefully selected mold-free cheese was used.

A second series of experiments involved wrapping of a variety of types of cheese, from a number of producing areas, in Parakote,* containing about 0.3% dimethyl dichlorosuccinate in the coating, and compared with controls wrapped in untreated Parakote. Some results are given in Table II.

In view of these results, one must conclude that dimethyl dichlorosuccinate as a wrapper additive effects a dramatic reduction of mold growth on the cheese surface. Furthermore, since cheese exposed to action of this substance maintains flavor, color, and appearance, use of the antimycotic to increase shelf-life and to minimize loss due to mold is of obvious benefit to both consumer and packager.

Inclusion of a small amount of a volatile material in a wrapper, and subsequent contact of its vapor with

* It was expected that vapors of dimethyl dichlorosuccinate would inhibit surface mold growth without transfer in massive amounts, as might be expected of a solid antimycotic agent.

** Prepared on pilot plant equipment by the Marathon Corp., Menasha, Wis.

the surface of the food product does not suggest contamination of product by reagent itself.[5,6,7] To be realistic, however, one must expect that any material in the package or atmosphere may be found in small amounts in the exposed food product.

Dimethyl dichlorosuccinate, when incorporated in wrapping materials used on cheese, does, in fact, transfer in small amounts to the food product. In view of this it is of prime importance to know to what extent this transfer occurs. Therefore, determinations were made of the amount of dimethyl dichlorosuccinate found in cheese packaged in treated wrappers. Typical data are shown in Table III.

These data show that, in ½-lb. packages of processed cheese, a maximum of 2.5 mg. (approximately 11 ppm.) of the antimycotic are to be found. By any standard, this amount of material is negligible when compared with other items that are found in cheese, or may have been recommended for incorporation in it or its wrappers at some time or other (see Table IV).

Relative acute toxicity (LD50) of dimethyl dichlorosuccinate when fed to rats or mice in butterfat solution is 450 mg./kg. This may be considered 3.8-8.2 (average 6) times as toxic as benzoic acid, a common food additive.*** When one considers that benzoic acid in 0.1% amounts is permitted in many foods, it is apparent that dimethyl dichlorosuccinate noted in cheese (at most 0.0011%) is 15 times as safe.

Similarly it may be shown that the antimycotic is 8.9-13 (average 11) times as toxic as sodium sorbate. But in view of the proposed level of sorbic acid in cheese,[9] due to its use in wrappers (.09%), it is apparent that dimethyl dichlorosuccinate is 17 times as safe, on the basis of LD50.

*** H. J. Deuel, Jr., R. Alfin-Slater, C. S. Weil, and H. F. Smyth, Jr. reported (*Food Research* 19-1, 1954), that the LD50 of benzoic acid was 1.7-3.7 g./kg.

Toxicity Picture Good

Long term toxicity picture for dimethyl dichlorosuccinate is good. In one experiment a group of rats was given an average of 5 mg. per day for nine weeks. All animals continued to grow normally and utilize food as efficiently as the control group. In this experiment animals were receiving the antimycotic at a level equivalent to an adult man eating 300 packages (½-lb.) of process cheese per day.

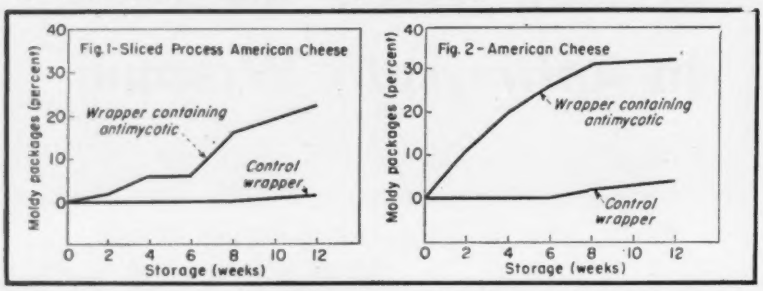
In a third experiment, rats were maintained on a diet to which 0.1% of dimethyl dichlorosuccinate was added. These animals continued to grow and exist normally for two years, at the end of which time the experiment was discontinued.

In view of the acute and long-term toxicity studies, it is considered that the small amount of dimethyl dichlorosuccinate present in cheese wrapped in antimycotic-containing wrappers has a negligible toxic effect.

So, since animal feeding studies indicated no long-term effect, it then was of interest to determine how the animal disposed of the compound when ingested. Accordingly, antimycotic containing radioactive carbon was synthesized. When this material was fed to rats, essentially 100% was recovered in the excreta within 48 hr.—about 10% as CO_2 in respired air, 15% in the feces, and 75% in the urine. At the end of the experiment no radioactive material could be de-

(*Turn to page 155*)

Graphs and Tables Emphasize Product's Value



FIGS. 1 & 2. Antimycotic-treated wrappers successfully inhibited mold growth.

TABLE I—DIMETHYL DICHLOROSUCCINATE Coated Wrappers Retard Mold Growth on American Cheese in Half-Pound Packages Stored at 45 deg. F.

Type of Cheese	Antimycotic in Wrapper Coating (Percent)	Packages Inspected	Mold (Percent) After (Weeks) 2	4	6	8	12
Sliced American process	0.00	144	1	6	6	16	22
Sliced American process	0.40	144	0	0	0	0	1
New York sharp American	0.00	196	11	20	26	31	32
New York sharp American	0.37	196	0	0	0	2	4

Parakote wrapper, 300 MAT-2 cellophane with 41 lb. per ream of commercial Parakote and dimethyl dichlorosuccinate as indicated. Cheese wrapped was mold free.

TABLE II—EFFECT of Antimycotic-Treated Wrappers on Mold Growth in Packaged Cheeses.

Types of Cheese	Size Pkg. (Lb.)	Storage Time (Weeks)	Pieces Inspected	Mold On Cheese In: Untreated Parakote (Percent)	Treated Parakote (Percent)
Natural cheddar	½	9	1600	77	6
Natural cheddar	10	13	280	40	5
Natural cheddar	½	4	100	100	0
Sliced Swiss	½	5	10	60	0
Sliced Swiss	½	6	20	30	30
Swiss bar	5	9	6	100	0
Swiss squares	½	9	39	73	12
Cream cheese	3 oz.	7	12	33	0
Sliced process	½	8	1768	67	1
Sliced process	½	5	74	22	10

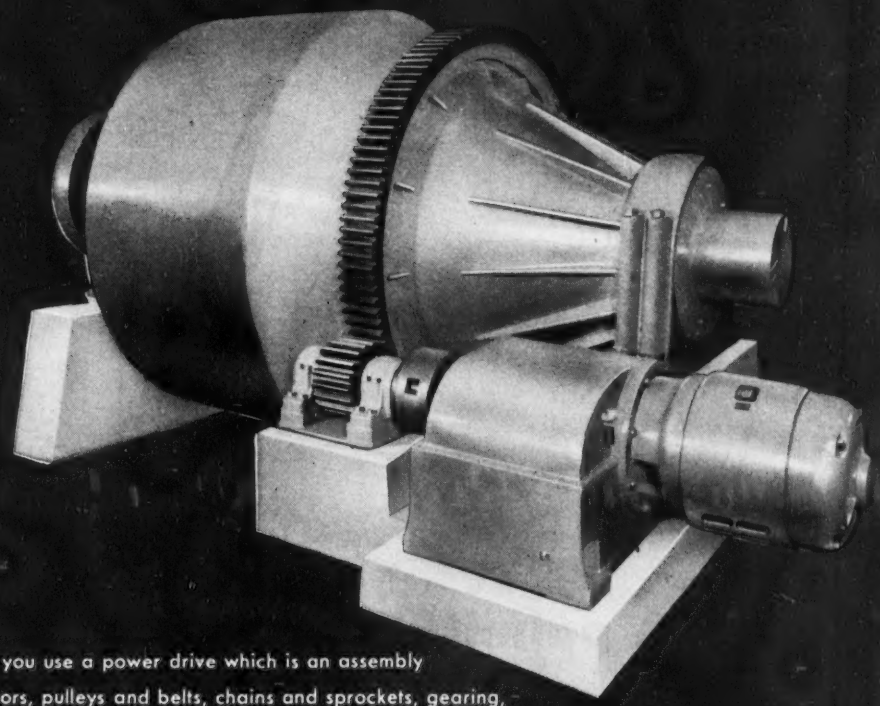
TABLE III—DIMETHYL DICHLOROSUCCINATE Transfers From Treated Wrapper to Cheese During Storage at 45 deg. F.

Types of Cheese	Mg. Antimycotic After Weeks: 2	4	6	8	10	18
Sliced process American	...	2.1	2.5	2.5	1.8	2.0
Sliced process cheddar	0.6	1.1	1.4	0.2	0.3	0.3
Sliced process Swiss	0.9	0.7	0.3	0.1	0.1	0.1
Natural American	0.3	0.2	0.0	...	...	...

TABLE IV—QUANTITY of Dimethyl Dichlorosuccinate Transferred From Wrapper to Cheese Is Much Less Than Amount of Other Additives Found or Recommended.

Substance	Source	Type of Cheese	Amounts Found in Cheese (Percent)	(Ppm.)
Dimethyl dichlorosuccinate	Wrapper	Sliced process	0.0011	11
Dimethyl dichlorosuccinate	Wrapper	Natural American	0.0009	9
Sorbic acid	Wrapper	Sliced process	0.09[1]	900[1]
Sorbic acid	Wrapper	Natural American	0.09[1]	900[1]
Dye solids	Added	Process American	0.0050	50
Wax solids	Wrapper	Natural American	0.25[2] 0.05[3]	2,500[2] 500[3]
Sodium propionate	Added	Sliced process American	0.3[4]	3,000[4]
Sodium benzoate	Added	Sliced process American	0.1[4]	1,000[4]

[1] Melnick, D. and Luckmann, F. H., *Food Research*, 19, 1954.
[2] Concentration in outer 1/16 in. layer of cheese.
[3] Wax was uniformly distributed throughout cheese.
[4] Amount required to inhibit mold growth (research data of Kraft Foods), Report C-247, Aug. 27, 1953.



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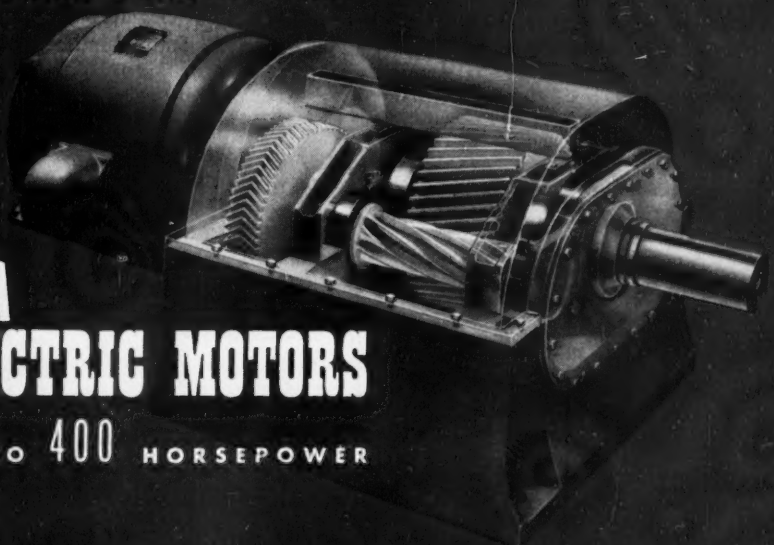

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Plastic Milk Tank-Trailer

New carrier is cited as ¶ Giving long life, with simpler, less costly maintenance . . . ¶ Tops in thermal and moisture insulating values . . . ¶ Able to take road shocks without deformation . . . ¶ Increasing payloads over conventional steel unit . . . ¶ Easy to clean . . . ¶ And, in addition, suitable for transporting other liquid foods

ONE of the most important developments in highway transportation of fluid milk is the new plastic trailer-tank.

And, although designed specifically for milk, it should prove applicable to handling other liquid food products—sugar, chocolate, and vegetable oils.

First of the new tankers, developed at the instigation of the Dairymen's League Co-operative Assn., Inc. (Dairylea) of New York City, was put into service at Syracuse, N. Y. in October 1953. Then a second tanker was added last March and a third in May.

Comparison of Weights

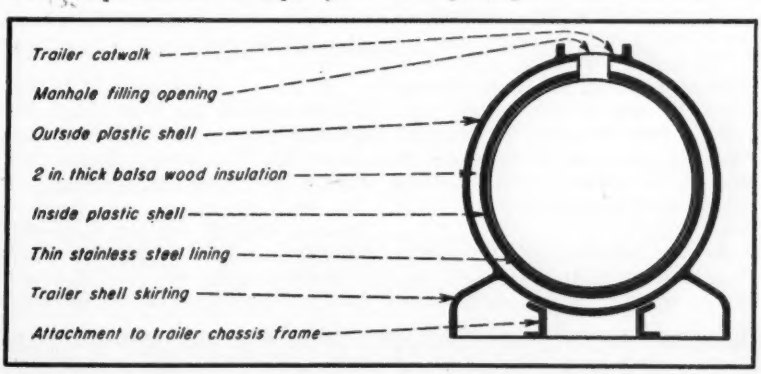
All three were fabricated by Insulation Associates, Fanwood, N. J.

Now, however, The Heil Co., Milwaukee, has obtained exclusive rights to the tanker-making process from the New Jersey firm. And the Midwest company will carry on the future developments of the unit, which it designates as the "Frigid-Lite."

Weight of the Dairylea tanker has been put at approximately 7,000 lb.

Heil points out that the weight of the plastic tank is approximately the same as that of its lightweight stainless steel transport of the same capacity.

Older tankers, of course, are heavier, and some 4,000-gal. units weigh from 9,000 to 14,000 lb. So compared to the older units, the new plastic tank would represent an increased payload of 235 to 825 gal., thus reducing hauling costs some 5c. per cwt. And a similar saving would be achieved with the lightweight stainless tankers.



SCHEME of laminations in new monocoque-type tanker (not to scale).

The Milwaukee company stresses greater strength per pound in comparison with stainless steel. The plastic tanks are provided with a thin, stainless steel inner-liner that complies with all sanitary regulations. Tanks may be cleaned by standard detergent materials in the normal manner without affecting the material in any way.

The liner is of oval cross-section 26-ft. long, 6 ft. wide, 4 ft. 4 in. from top to bottom. It was made by Glasco Equipment Co., Paterson, N. J. Also included are conventional stainless steel valves, and manholes and plastic dust covers.

Like Aircraft Practice

Over the entire inner-liner shell is placed a skin made up of a Fiberglas cloth (Owens-Corning), and a mat combined with a polyester resin (Celanese Corp. of America). The glass fibers of the cloth serve as reinforcing agents, affording tensile strength equivalent to that of fine steels but with a weight less than a third as much.

Then over this skin is laid a 2-in. covering of balsa wood serving as an insulating medium. And finally on top of this comes a second plastic skin. This is the outside of the tank.

It is noted that this type construction closely follows the monocoque, or single-shell, practice that was developed in the aircraft industry for making light, yet strong, airplane fuselages. Involved in the latter is wrapping of strips of veneer around formers to make a body in which stresses are carried by the veneer.

Exceptionally Strong

The milk tank incorporates a true sandwich wall in which two high-tensile skins are permanently held in position by bonding to the opposite sides of a low-density core. The lightweight reinforced plastic skins provide the outsides of the sandwich, while the 2-in. sheet of balsa is the core.

The advanced molding method imparts exceptional structural strength to the tank. In addition, superior insulating properties are assured for the life of the tank by the virtually complete protection against moisture infiltration given the balsa wood by the plastic surfaces. The molding process itself forms an excellent vapor seal.

Another advantage of the plastic skins is their ability to absorb road shocks without permanent deformation—an ability cited as greater than that of steel. For example, the skirting that forms the bottom of the outside skin (designed to prevent spattering of mud and dirt on the tank by the wheels) can be distorted as much as 6 in. without taking a permanent "set."

Repairs to such outside-skin marring as gouges, dents, and tears — readily can be made without structural changes, and without need for exceptional skill on the part of the repairman. A simple patching process does it.

How They're Fabricated

In construction, the different thicknesses of the tank are formed and combined in a large wooden mold. Here, the outside shell is set in upside-down position—that is, with the shell skirting at the top.

What is known as the dry lay-up method is employed, with the polyester resins being introduced to complete the job. After a short curing period, the tank is lifted, complete, from the wooden mold.

Neither conventional-type painting nor any special additional step in the molding process are required to paint the tank. Whatever hue is desired on the tank is simply obtained by coating the inside of the wooden mold with a pigmented resin overlay before the fibrous glass is laid up. This overlay then adheres to the resin-impregnated surface, thus providing a permanent outside color finish while the tank is being molded.

In addition, name lettering or brand designs can be provided during the molding, in any desired contrasting colors. Should it be desired, the outer surface may be painted in the conventional way.

Once the tank is lifted from the mold, all that is necessary to get it into operation is to attach the outlet valves, bolt the running gear to the trailer chassis frame, hook up the lights, and add the manhole and dust covers.

In the Dairylea tanker that's shown, some of the electric wiring for the trailer lights has been molded in place integral with the tank.

Chassis Simplicity

With a circumference of 18 ft., the Dairylea tanker has been called the largest one-piece molding yet produced for highway use. Because the tank is structurally self-supporting, it can be mounted on any standard trailer chassis, to conform with such limitations as must be met in the line of laden weights, tire sizes, and axle loadings, according to specific state regulations.

As for price, Heil gives the following picture: "Inasmuch as the plastic tanks now in operation have been built on a more or less experimental basis, it is very difficult to compare their costs with those of conventional stainless steel tanks now being built on a production-line basis. But from the information available, the best estimate would be that plastic tanks will be priced in the same range as those of stainless steel."

Further advantages are claimed for the plastic tank in operating and maintenance costs because of long life and shorter periods of down-time, ease of repair, and elimination of need to repaint (the finish being integral with the plastic itself).

Dairylea's three tankers "are hauling milk every day and doing an unexpectedly good job," says Traffic Manager C. F. Hawes, under whose direction they operate.

Structurally, each is mounted on a single trailer axle carrying the General Tire Co. air-spring cushion to provide easier riding. However, it's not mandatory that such an axle be used. With tank construction of this type, any rear-axle suspension may be employed.

The trailers are equipped with an electric brake system that works in conjunction with the standard air brakes (Brockways) on the tractors. Both systems are operated simultaneously from the driver's brake pedal.

Dairylea-unit weights, as reported by Heil, are: Tractor, 10,400 lb. average (9,500 lb. to 11,500 lb.); tank and running gear, 7,400 lb.; and load, 34,400 lb. This gives a gross of 52,200 lb.

Lower C.G.

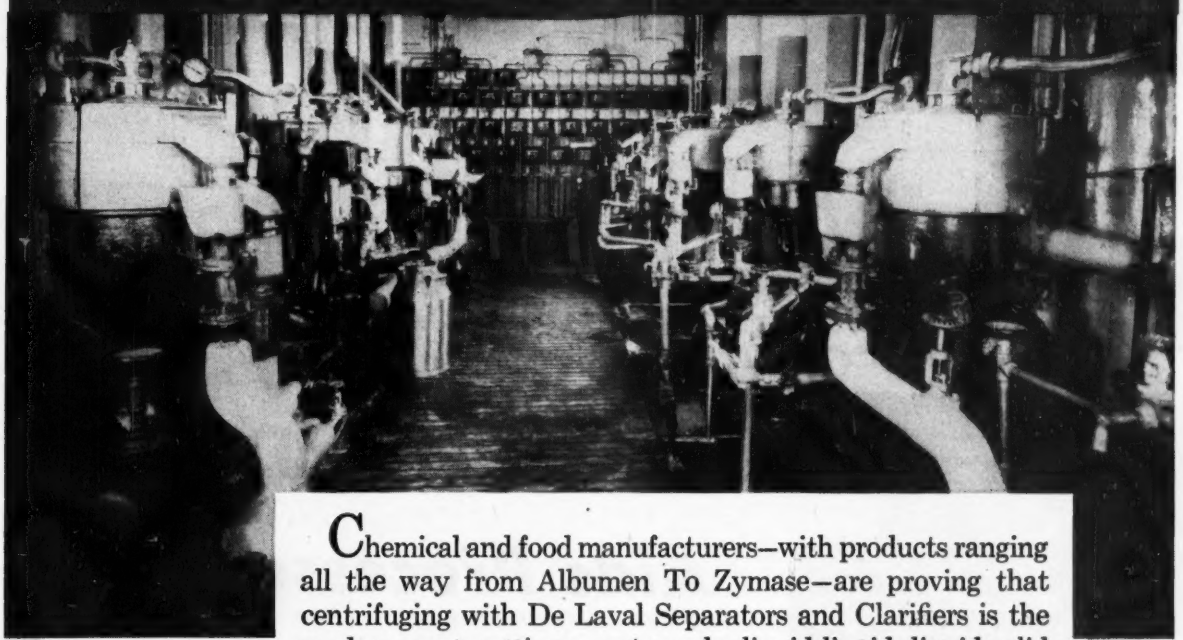
Each tank has a silvery white color, impregnated in the shell as described. Overall height of tanks from road is 8 ft. 9 in. The tank's center of gravity is 3½ in. lower than on Dairylea's other tank trailers of the same capacity.

It is emphasized that the inner shell is perfectly smooth and thus resistant to pickup of contaminants or residues, and proof against rust, corrosion, and acids.

The plastic surface is stated to retain its clean original appearance for a great length of time, and washing it with standard detergent materials is called an easy operation.

As for the future of the Frigid-Lite tanker, Heil declares it appears very promising. "However," it says, "the application of reinforced plastics to large structures is still in the early stages and, as might be expected with transport equipment so completely new in character, time will be required for proper research and development in accordance with sound principles of new-product introduction."

DE LAVAL *CONTINUOUS* SEPARATION IS PAYING BIG DIVIDENDS!



Chemical and food manufacturers—with products ranging all the way from Albumen To Zymase—are proving that centrifuging with De Laval Separators and Clarifiers is the modern, *cost-cutting* way to make liquid-liquid, liquid-solid and liquid-solid-liquid separations.

De Laval Centrifugals have streamlined production for these manufacturers. Instead of slow, uneconomical batch separation by filters or settling tanks, they are getting fast, *continuous* separation—uninterrupted material flow—saving time and money.

In addition, there are many processes in which De Laval Centrifugals also improve the product by doing a *more thorough* job of separation or clarification.

De Laval Engineers have helped many manufacturers of chemicals, pharmaceuticals and foods remove separation bottlenecks from processing. They can do the same for you.

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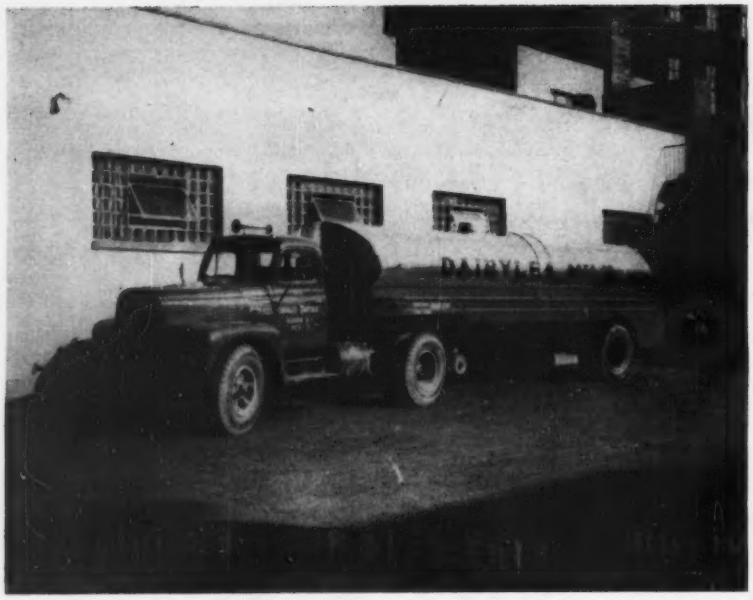
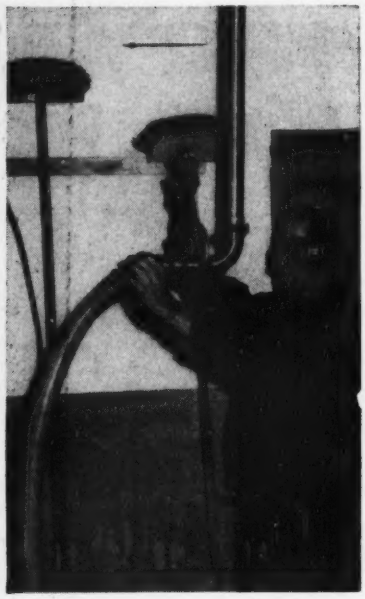
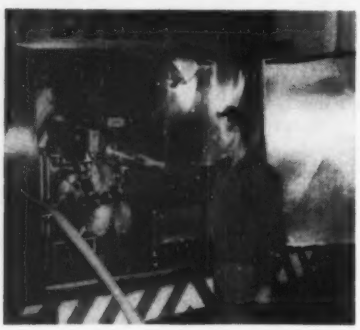
Use coupon on page 233.



1 **TANKER** arrives with 3,000 gal. of milk picked up from farms in Niagara and Erie counties, N. Y. It backs into unloading room.



2 **DRIVER** connects hose from tank-truck to plant system.



3 **HE** then turns valve in rear of tank, and starts pump (left).

BULK HANDLING

Aids Processor, Too

When operated on a 100% basis, it garners appreciable savings in labor, fuel, power, and materials . . . Further provides low-cost space in plant for expansion

F. M. BIGWOOD and W. J. WALSH

Respectively, Field Supervisor and Division Representative, Dairymen's League Co-operative Assn., Inc., Buffalo, N. Y. (Photos by *Dairymen's League News*)

ALTHOUGH more producers are benefitting from bulk handling of milk on the farm each year, very few dairies have yet gained the maximum advantages inherent in the system.

This is because most plants are still receiving a part of their milk in 10-gal. cans.

Not so, however with our Dairylea, Carrigan branch in Niagara Falls, N. Y. For here producers in Erie and Niagara counties have come in 100% on the bulk-tank method. Consequently, all our milk arrives by tank truck and is pumped directly to processing.

As a result, the following seven savings are realized:

1. Refrigeration – 75 ton-hours daily.

2. Fuel–15-20%.

3. Electric power–5%.

4. Labor–6 man-hours daily.

5. Cleaning materials–$15-$20 per month.

6. Depreciation on cans–approximately $900 per year.

7. Depreciation and maintenance of receiving, can washing, and conveying equipment.

In addition, our bacteria counts of incoming milk are lower. Also, space formerly required for receiving now houses additional equipment. And public relations have been greatly improved.

Immediate Savings?

Until a dealer is able to obtain his entire supply of milk by the bulk-tank method, he has little to gain by its installation on farms.

But once he is assured of such a supply, he can immediately consider elimination of his weigh-room equipment. This means weigh tanks and scales, can washer, and conveyors.

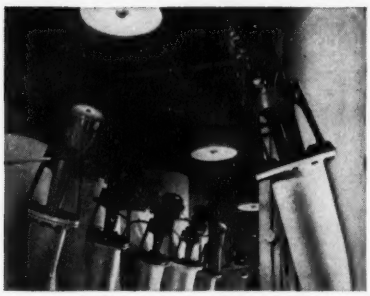
These are all expensive pieces of equipment–both from the standpoint of original investment and current maintenance. The item of cost involving cleaning and sanitizing materials within the can washer is eliminated, as is also the labor attached to receiving and dumping milk, and cleaning the equipment and its feeding pipelines.

In many instances, plant operators find that they have a much better utilization for this weigh-deck space. Thereby they save the expense of plant expansions. Also, by having the milk cooled to 38-40 deg. F. at the farm, and transporting it to the plant in insulated tank trucks, there is little if any rise in temperature at the time of its arrival.

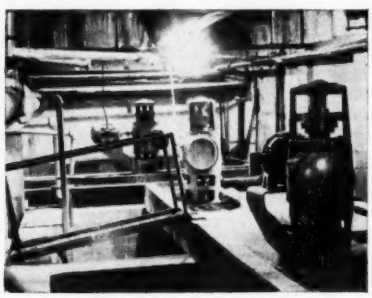
Where milk is received at such a

(*Turn to page* 155)

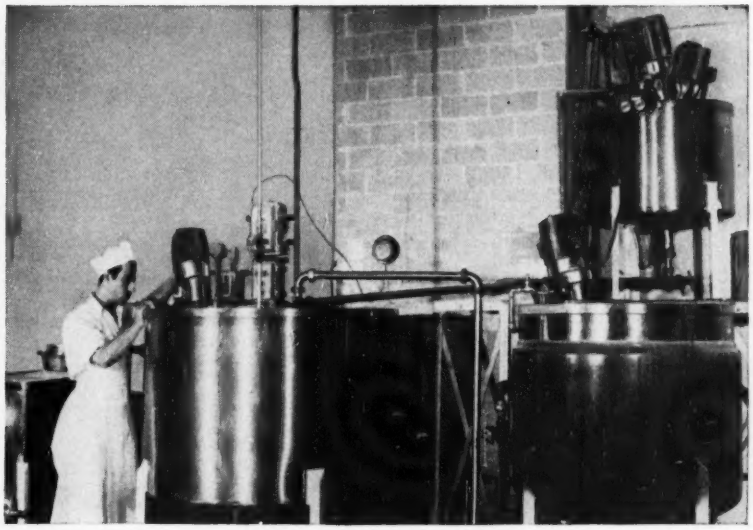
YOU CAN USE A LIGHTNIN Portable Mixer on any open tank, kettle, or other vessel. Shaft and propellers are easily removed, interchanged. Mixer swings fully out of tank for easy cleaning. Thirty models to choose from. Sizes ⅛ to 3 HP.



LIGHTNIN top entering propeller mixers, for open or closed tanks. Sizes ¼ to 3 HP.



LIGHTNIN turbine and paddle mixers, for big mixing jobs, fit any open tank or closed pressure vessel. Full range of speeds, impellers, materials of construction. Sizes 1 to 500 HP.



STIRRING chocolate marshmallow product with LIGHTNIN Mixers

Guaranteed to mix fluids the way you want 'em mixed

You get the exact uniformity you want—as quickly as you want—when you mix fluids with LIGHTNIN Mixers.

That's because every LIGHTNIN Mixer is *guaranteed* to do the job you expect it to do—or you get your money back.

LIGHTNIN Mixers are the flexible, safe way to blend liquids, make up syrups, add flavors, dissolve powders and crystals, beat pulps and suspensions, stir products while cooking—and do dozens of other mixing jobs at low cost.

Flexible—Because LIGHTNIN Mixers are built of standard parts and can often be adapted to different mixing jobs, should your process ever change.

Safe—Because LIGHTNINS are equipped with ball-bearing motors, extra outboard shaft bearings, and other mechanical "extras" for long life. Many of the thousands of LIGHTNINS in service today have operated more than 20 years.

For quick help on any fluid mixing problem, just let us know the materials you are mixing, and the results you want to accomplish. It costs you nothing to get the facts—and there is no obligation. Write us today, won't you?

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LIGHTNIN Catalogs contain practical data on impeller selection; sizing; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Yours without obligation. Check and mail coupon today.

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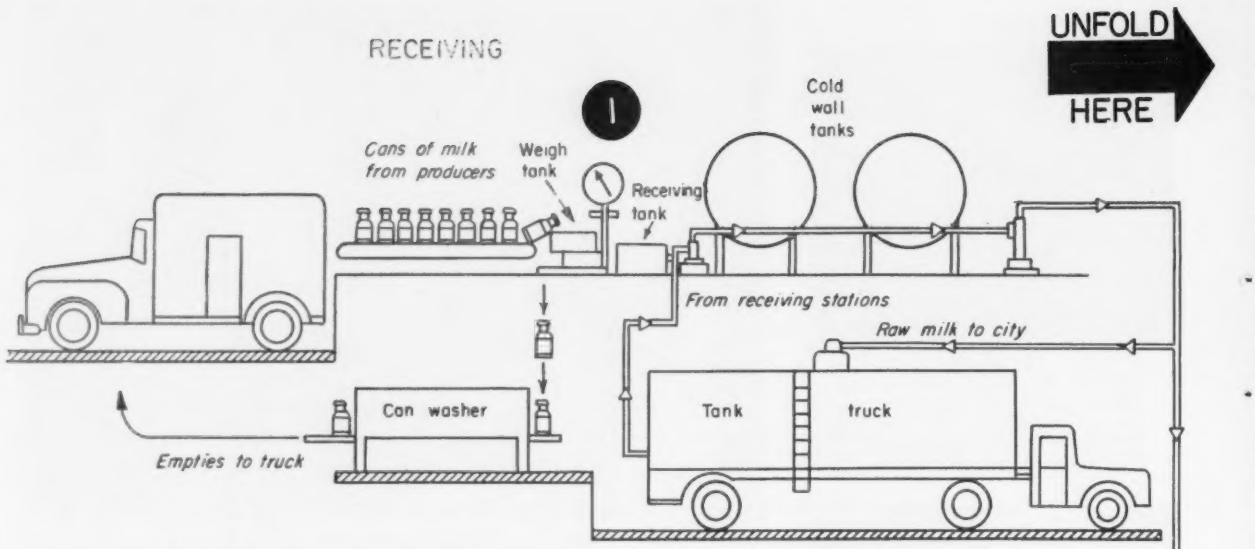


Pattern-Setting Dried Milk Plant

Its advanced line keys into multi-product operation

UNUSUAL VERSATILITY is an outstanding feature of the milk drying plant of Rieck Dairy Co., Springboro, Pa.

For although the plant was designed primarily for manufacture of spray dried, low-heat milk powder for use in cottage cheese and buttermilk, milk may leave it in many other forms.

It may be transferred to tank trucks and hauled to the company's bottling plant in Pittsburgh. Or it may be separated, providing cream for use in ice cream and other products, and skim for further processing.

The skim is condensed for use in ice cream or as a step in the drying process. Sweetened condensed also is made. Finally, in addition to the low-heat powder mentioned above, a high-heat powder for such uses as baking, is produced.

Operations Pinpointed

Raw milk is received in 10-gal. cans directly from producers—Point 1 in accompanying flowsheet—and by tank truck from other receiving stations in northwest Pennsylvania and eastern Ohio. It is pumped to one of two 4,000-gal. cold-wall tanks, where it is immediately cooled to 40 deg. F.

For use in Pittsburgh, the cooled raw milk is transferred to tank trucks. For further processing, it is pumped through a preheater to a separator (Point 2). Cream from the separator flows through a heat exchanger, then to a 1,000-gal. cold-wall tank. From here it is pumped to cans or tank trucks and hauled to one of Rieck's bottling or manufacturing plants.

Skim from the separator is pasteurized in a tubular heater (Point 3) and discharged into one of two hot wells that supply the 6-ft. single-effect vacuum pan. Sugar is added here when sweetened condensed is the desired end-product. For either sweetened or plain condensed, the skim is further heated in the hot wells before it is drawn into the pan. For low-heat spray-dried powder this heating step is omitted.

Finished condensed is pumped from the pan and through a filter, then into cooling vats. Sweetened condensed is drawn off into barrels at this point. Regular skim condensed may be transferred to tank trucks for delivery to points of use, or pumped to storage tanks.

For drying, condensed is transferred from the storage tanks through a preheater to a high pressure pump that feeds the spray nozzles in the dryer (Point 5).

Drying is accomplished in a Rogers stainless steel box-type unit with tile floor. It is equipped with fabric curtain and bag collectors. Major part of the powder is stopped by the curtain and falls to floor of dryer. Remainder collects in bags, which are shaken at regular intervals causing it to drop out.

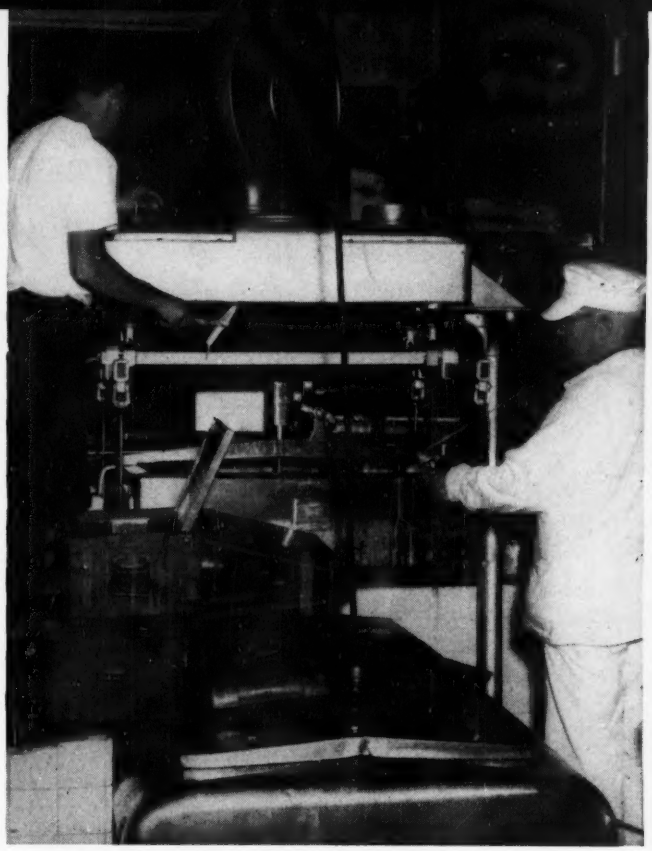
Floor of box is constantly scraped by a drag conveyor that moves the accumulated powder into a screw that conveys it out of the dryer. Another screw elevates and drops the powder into a vat, which employs a helical coil through which 52 F. well water is pumped, to move the powder from entrance to exit end and, at the same time, removes excess heat. Cooled powder (90 F.) is elevated to sifter, then packaged in either 100-lb. bags, or 225-lb. drums (Point 7).

Advanced Engineering Ups Capacity

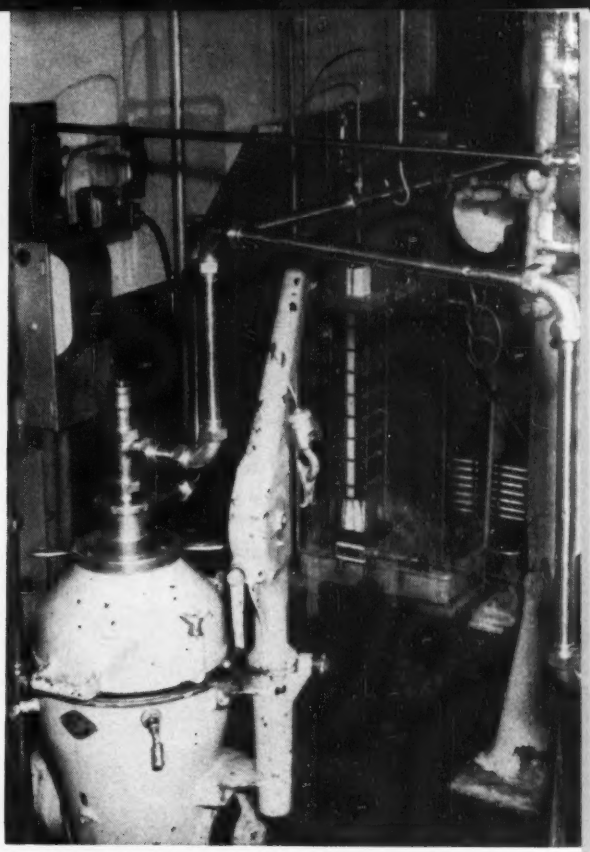
Dryer was originally designed to produce powder at 400 lb./hr., using 40% solids condensed, and 100 psi. steam. By addition of an extra heating coil through which is passed condensate from other coils, and employing 125-psi. steam, capacity was increased to 525-550 lb./hr. of powder.

Three 150-hp. stoker-fired boilers supply steam for the plant. Two of these are watertube boilers; the third is an economic with water walls.

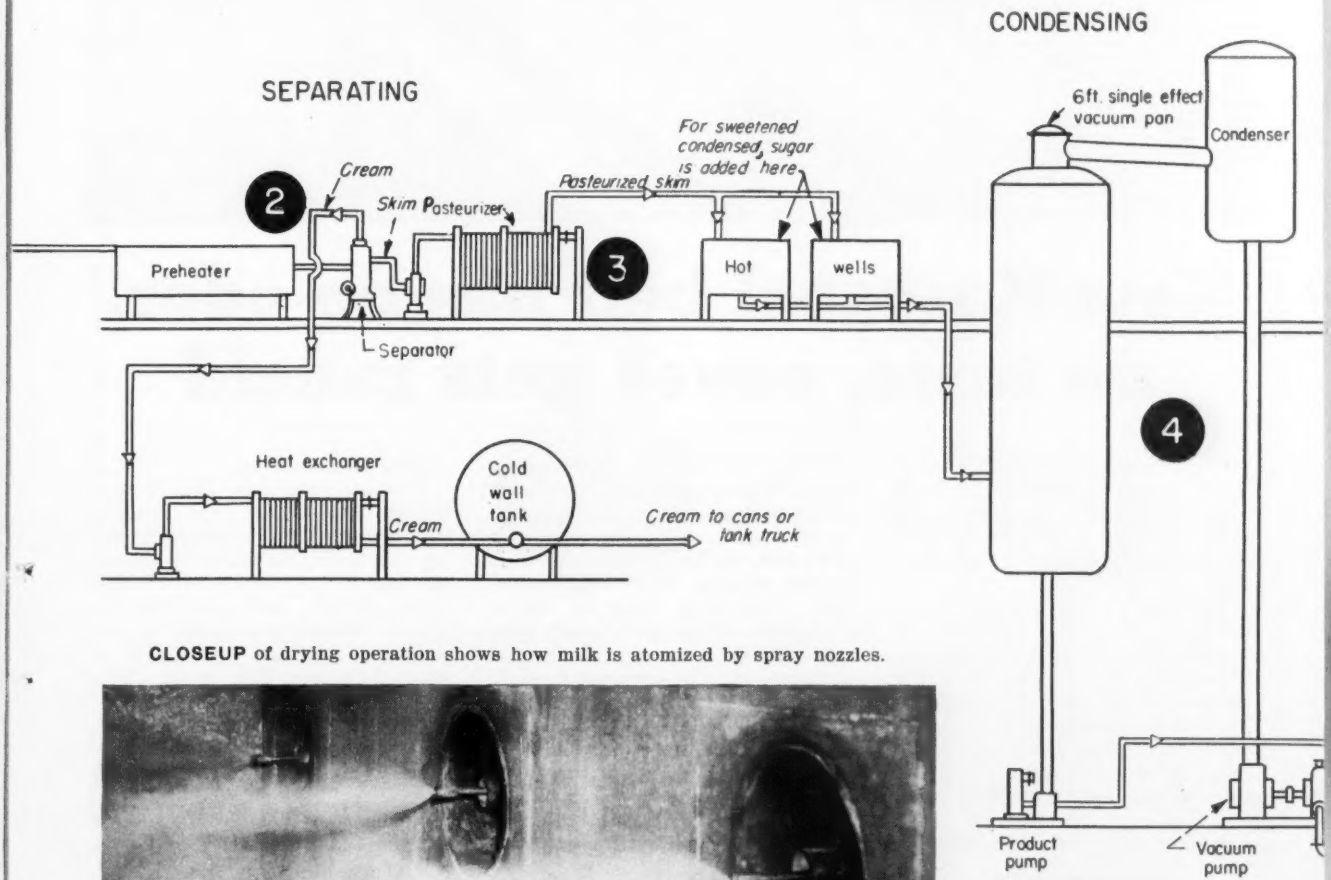
Refrigeration for the cold wall tanks and a small ice bank is furnished by two 7x7 single-acting vertical compressors. And water for cooling and ammonia condensers comes from deep wells. All plant wastes are treated in a modern disposal plant, from which a low BOD effluent is discharged into a passing creek.



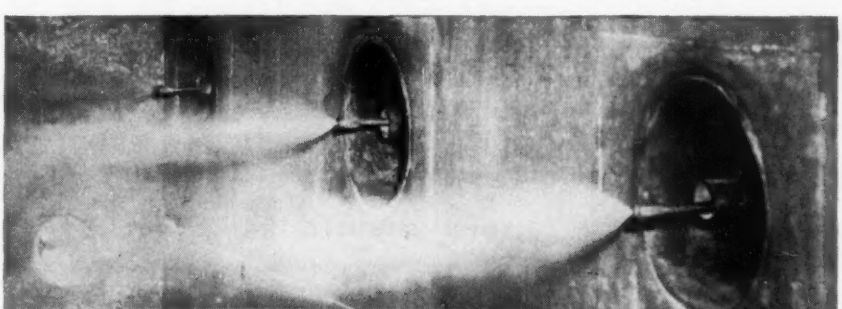
1 **INCOMING** milk is weighed, then pumped to cold-wall storage tanks. Samples are taken for butterfat and sediment.

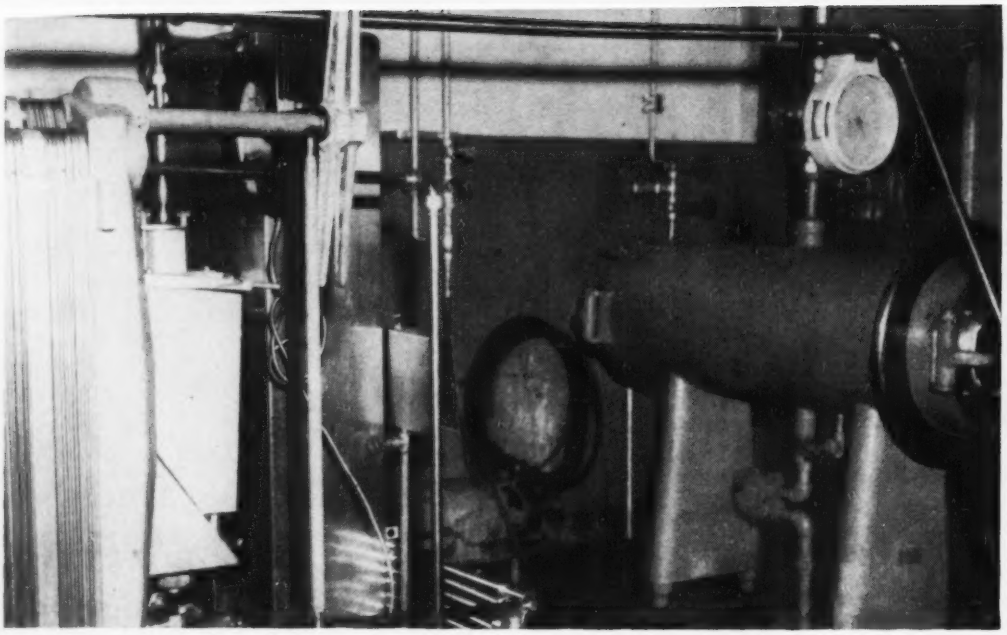


2 **MILK** is pumped from storage tanks through preheater t separator (foreground). Cream is cooled in unit (rear).



CLOSEUP of drying operation shows how milk is atomized by spray nozzles.





3 **SKIM** from separator goes to tubular heater (right), where it is pasteurized, then discharges to hot-well supply tank on floor above. Seen left is plate unit in which cream is cooled.

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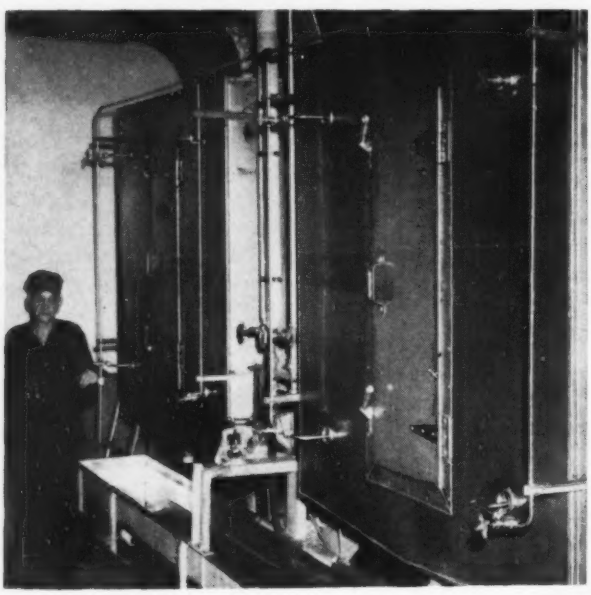
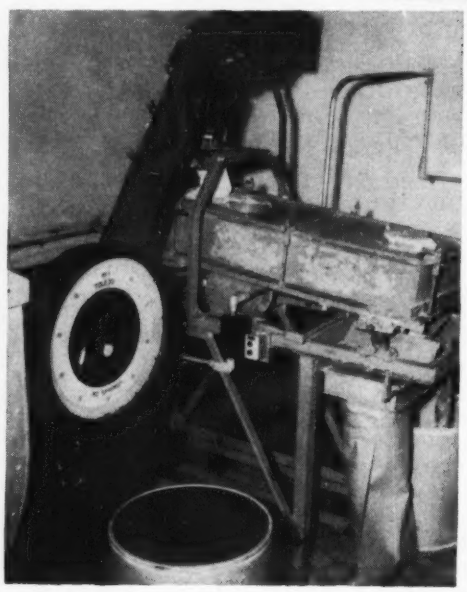
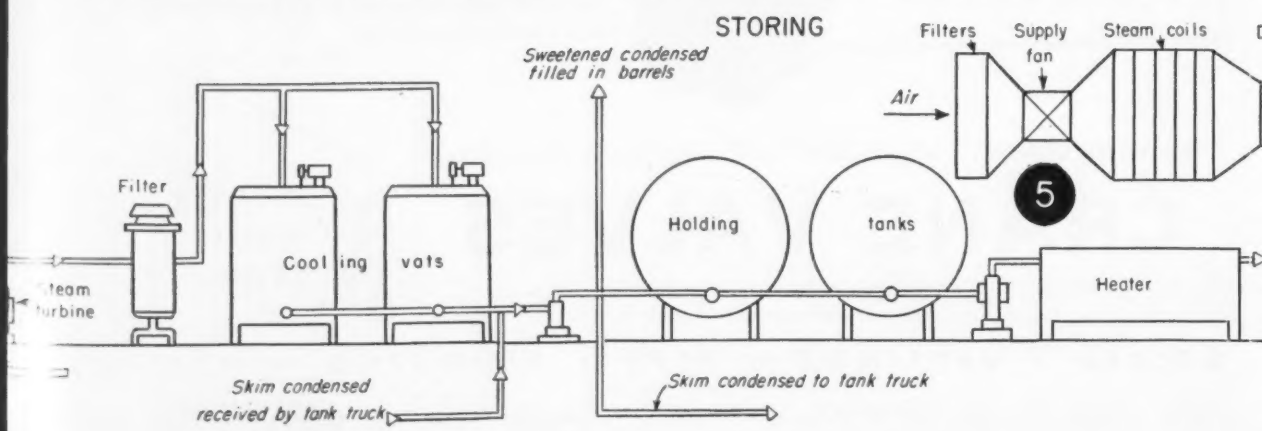
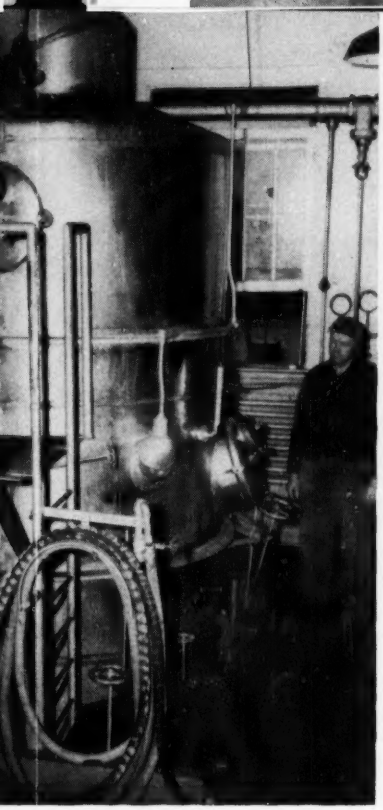
6 **DRYING** is performed in stainless unit employing spray nozzles fed from high-pressure pump.



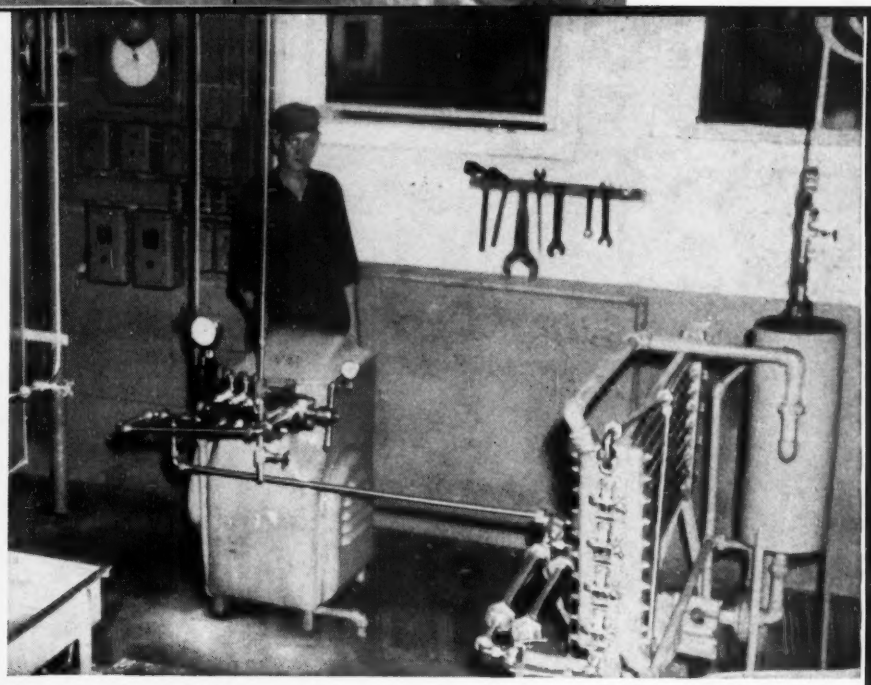
7 **POWDER** is cooled, then screened and packaged.



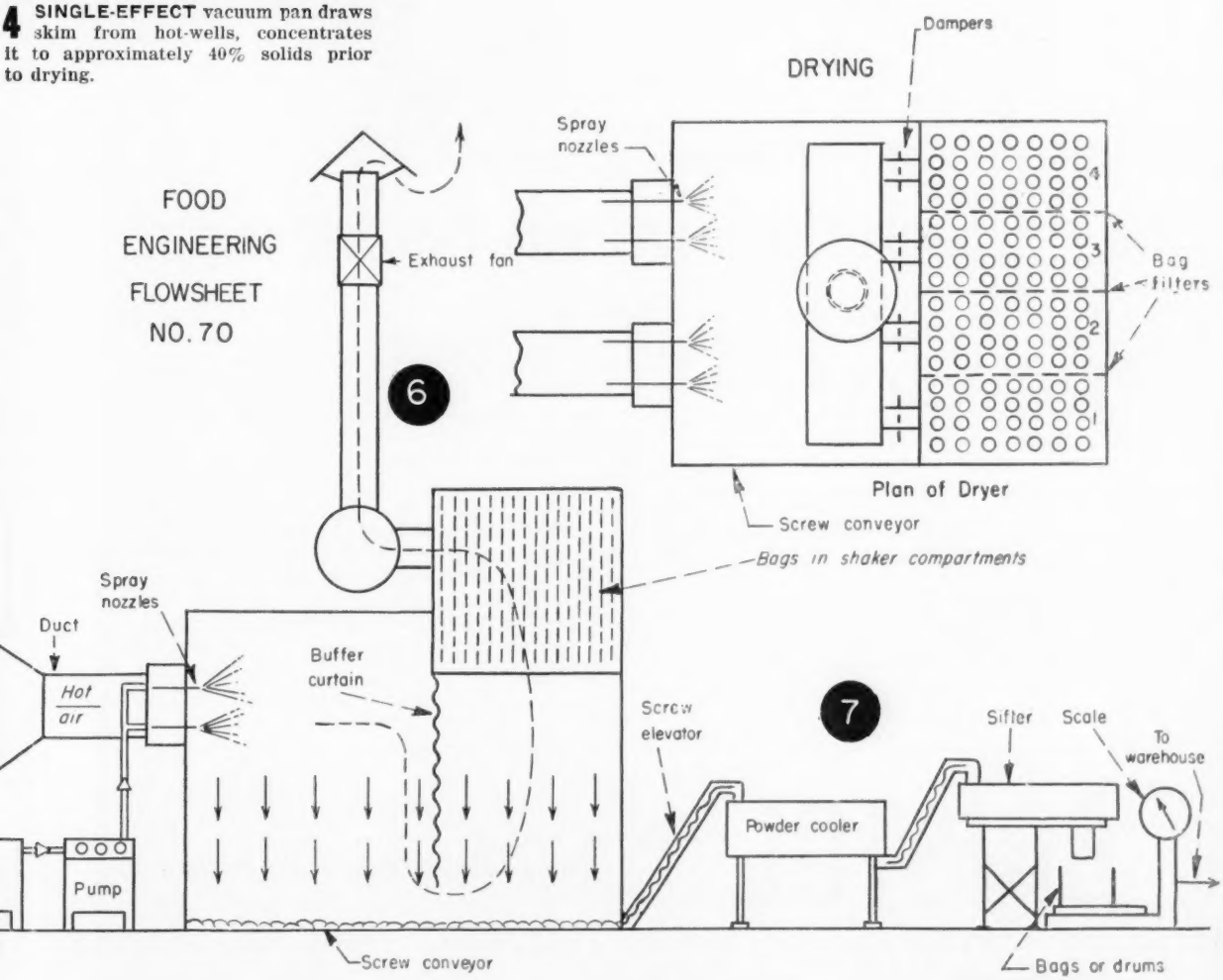




4 **SINGLE-EFFECT** vacuum pan draws skim from hot-wells, concentrates it to approximately 40% solids prior to drying.



5 **CONDENSED SKIM** is brought to desired drying temperature in heater (right), then pump (center) delivers it to spray dryer.



No maintenance problems with this instrument!

In spite of all of the development work being done on automatic control instruments, the Bristol Series 500 Air-Operated Controller is still the most dependable and trouble-free — as proved by thousands of installations. And here's why:

It's the simplest to service. Only one adjustment with a ¼ in. wrench calibrates the control system. No other adjustment is needed. Control system can be completely disassembled and, after reassembly (even with replacement parts), can be *exactly calibrated by this one simple adjustment.*

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For more facts and figures about the Series 500 Air-Operated Controllers, write for free 32-page bulletin A120. The Bristol Company, 115 Bristol Road, Waterbury, Connecticut. 4.27

TRADE MARK BRISTOL'S REG. U.S. PAT. OFFICE

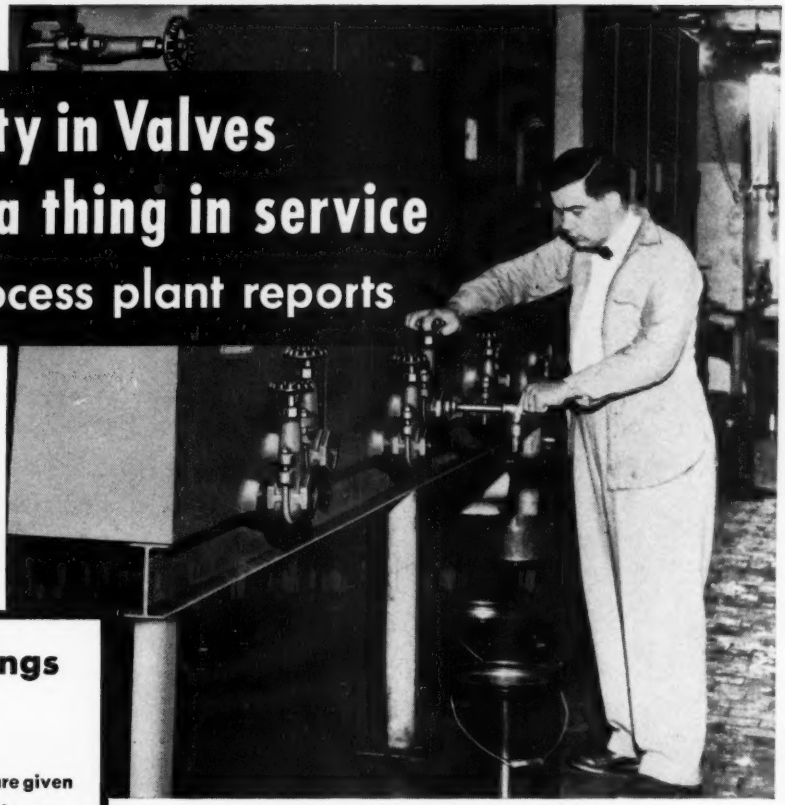
BRISTOL

POINTS THE WAY IN HUMAN-ENGINEERED INSTRUMENTATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Similarity in Valves doesn't mean a thing in service

...Chicago process plant reports



The Installation

At Hysan Products Co., Chicago manufacturer of liquid waxes, pine oil and coal tar disinfectants, liquid soaps, insecticides and various chemical specialties—where Crane clamp gate valves have been installed on all process and storage piping.

Valve Service Ratings

SUITABILITY: Performance-proved

FEATURES: Tight seating

MAINTENANCE COST: Only routine care given

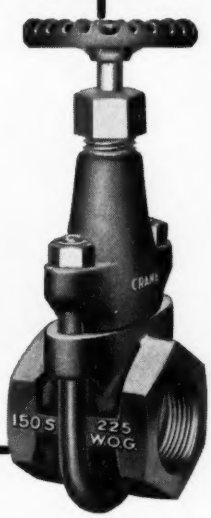
SERVICE LIFE: Many times former valves—still like new

OPERATING RESULTS: Costly loss and trouble stopped

AVAILABILITY: Crane Catalog item—No. 488

The Valve

Crane clamp gates are of rugged design, with seating surfaces machined to close tolerances. That's why they provide long-lasting, tight closure, even where operation is frequent and fluids are hard to hold. Many patterns to choose from in these compact valves—all iron or brass-trimmed. Consult your Crane Catalog or your Crane Representative.



The Case History

Longest service given by similar type valves formerly used was from 2 to 6 months. They failed to hold tight at seats and disc under daily operation of 3 to 12 cycles. Valve maintenance and replacements were excessively costly—as were down-time losses. Leaky valves on tank lines forced repeated transfer of storage stock. Up to 3 men were needed to make valve repairs.

Only when the plant switched to Crane No. 488 clamp gate valves was the trouble stopped. Installed more than a year ago, the valves show no sign of wear or leakage. Only an occasional pull-up on the packing nut is needed—and only one man for all piping maintenance.

What's the answer? Better quality valves, obviously—the only way to assure better service and lower ultimate cost.

THE BETTER QUALITY . . . BIGGER VALUE LINE . . . IN BRASS, IRON, STEEL

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Use coupon on page 233.

B. F. Goodrich announces

New Koroseal belt has no odor, no taste, never gets rancid

IN this bakery, fresh bread used to ride a canvas belt from ovens to wrapping tables. But oily film clinging to the warm loaves stained the canvas, made it impossible to keep clean, soon ruined it.

Then the smooth, polished Koroseal belt in the picture was tried, and it solved all these problems at once. Because it's made of Koroseal flexible material, this new B. F. Goodrich belt stands cooking oils, animal fats, most acids—and stands hard use, rough handling, and just about everything else that ruins most materials.

Unlike belts that are just coated with plastic, Koroseal is used throughout this B. F. Goodrich belt, and so resists cracking and peeling, never gets soft or sticky. Oil can't penetrate Koroseal's tough surface, food particles can't grind in. That's why this belt is so easy to clean. Most stains, grease, even sticky icings come off with a damp cloth. Either way, cleaning time is cut in half!

Other new belts, developed by B. F. Goodrich for food handling, include a thin white Koroseal belt for use in cooling tunnels, and two belts, called Highseal and Kleenseal, that are made of new types of rubber compounds. Their "sight-saving" green color reduces glare and eye strain on packaging and inspection lines.

Find out more about these longer-lasting, work-saving food handling belts. Have your BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. If you don't know the distributor nearest you, write us and we'll have him call you. *The B. F. Goodrich Company, Dept. M-298, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

"Tracers" Seen As Answer In

Detecting Foreign Fats

To date, low vegetable-fat adulteration of dairy products has evaded test techniques. But new research with additives now bids fair to achieve 10% checks

J. FITELSON
Fitelson Laboratories, Inc., New York City

HIGH PRICE of butterfat during recent years has brought to the fore the problem of its adulteration with cheaper animal and plant fats, particularly in ice cream and frozen desserts.

And production of frozen desserts made with fats other than butterfat (termed mellorine) has further aggravated the problem in states permitting sale of these products.

It isn't surprising, therefore, that methods of detecting foreign fats in butter and other dairy products have attracted much attention of late. And, although these fats are easily distinguished from butterfat by available chemical tests, partial substitution—10-20%—is difficult to detect.

For this reason, practically all research in the field has been directed toward development of reliable analytical tests for spotting small amounts of foreign fats in butterfat. Aim is detection of approximately 10% adulteration.

▶Among many new methods that have been advanced in the past few years, greatest promise appears to be offered by employment of "tracers."

As for the other techniques, claims of some are hardly justified, while merits of others suffer from specific limitations.

These latter methods are usually based on measurement of a characteristic butterfat component, which is changed in quality by the admixture with a foreign fat.

In a few cases, however, they depend on presence of a substance found in foreign fats and absent in butterfat. These components are found in the fatty acids, triglycerides, or unsaponifiable matter of the fats.

All fats consist mainly of glycerides (98-99%), which are chemical combinations of glycerol and fatty acids—three fatty acid molecules to each glycerol molecule. Since there are many fatty acids found in natural fats, most of the triglycerides have two or three different fatty acids and are known as mixed triglycerides.

Nature of triglycerides depends on amount and type of fatty acids present. Thus, cottonseed oil contains a relatively small number of fatty acids so that the number of different triglycerides are limited. Butterfat, on the other hand, is distinguished by the extremely large number of fatty acids, and consequently the glyceride composition is extremely complex. It also differs from others fats, except coconut oil, in the low molecular weight of its fatty acids, and from coconut oil by its high steam-volatile acids which are also water soluble.

Detection Relatively Easy

Because of this complexity, butterfat is readily distinguished from other fats. The classical Reichert-Meissl value determines the water soluble portion of steam-distillable fatty acids in butterfat, consisting largely of butyric acid. Normal value of 24-34 is much higher than that of any other natural fat.

In the past few years another method has been widely used to differentiate rapidly between butter and oleomargarine. This is the Critical Dissolution Temperature test, in which a hot solution of fat in an organic solvent is slowly cooled until a turbidity forms. Turbidity temperature of butterfat and the fat used in oleomargarine are far enough apart to permit identification of the nature of the spreads.

These established methods are of little use in detecting presence of 20% or less foreign fat in butterfat, mainly because of variation in com-

Thumbnailing The Test Troubles

REICHERT-MEISSL VALUE?

☛ FAILS TO GO FAR ENOUGH

CHROMATOGRAPHIC TECHNIQUES?

☛ LACK AUTHENTIC DATA

TRIGLYCERIDE CRYSTALLIZATION

☛ RESULTS NOT REPRODUCIBLE

TOCOPHEROL CONTENT?

☛ MISSES CERTAIN FATS

STEROL-ACETATE MELTING POINT?

☛ TOO LENGTHY AND COMPLICATED

position of natural products. Butterfat is made by the mammary glands of the cow from the glycerides present in the blood stream, and is known to exhibit a pronounced seasonal change in fatty acid composition associated with differences in feed.

If the cow is fed fatty material rich in unsaturated oil, as soybean cake or linseed cake, a soft butterfat with a high iodine number is produced. Similarly, feeding coconut cake will produce a hard, low-iodine value butterfat. Differences in butterfat composition also occur with temperature changes, increased activity of the animals, type of cow, age of the animal, and duration of the period of lactation.

This variation in composition is reflected in the analytical constants, which fall within a range of values. When this range is narrow, indicating limited variation in the fat components, the constants can be useful in detecting adulteration at low levels. When the ranges are wide, it is necessary to have large amounts of foreign fat present to obtain definite proof of adulteration.

As previously stated, the normal range for Reichert-Meissl values is 24-34. However, literature records extremes of 12-40, although many of these values were obtained from single cows or from animals under special feeding conditions.

Although commercial butterfat rarely deviates from the normal range, effect of recorded abnormal values on the courts must be considered in regulatory actions, which may lead to legal contests.

Because of these relatively wide ranges in the "constants" it is not possible to definitely establish less than about 25% adulteration in many cases by means of these classical methods.

Butyric Acid by Chromatography

An improvement on the Reichert-Meissl method has been suggested by Keeney,[3] and by Harper and Armstrong.[5] They determine butyric acid content in fat by a chromatographic procedure. In the Reichert-Meissl method, details of manipulation must be followed carefully in order to obtain reproducible results. Most of the Reichert-Meissl value is due to the butyric acid. But only about 85% of the butyric acid content of butterfat is obtained in the steam distillation. Hence, the newer chromatographic method is superior, since it determines all of the butyric acid precisely, and is not affected by variations in the other water-soluble acids.

Claiming that they can detect 10% adulteration by the lowering of the butyric acid content, Harper and Armstrong report a range of 9.5-10.7% molar concentration of butyric acid in the fat from 26 samples of vanilla ice cream, and Keeney reports a similar range in butterfat. However, Hilditch[6] reports that cows on different feeds gave a butyric acid variation of 8-11% molar concentration. From this it does not appear possible to detect 10% adulteration by this method unless composition of original butterfat is known.

There is, as yet, insufficient authentic data available to determine limitations of the butyric acid method. It is understood, however, that a program to accumulate this necessary background of information is now under way. And it is planned to examine commercial butterfat on a regional basis, so that ranges for each producing section can be determined, thus obtaining narrow limits of variation for each region.

Such information will require several years of testing but will provide a sound basis for interpretation of analytical results. Abnormal values caused by eccentricities of individual animals or by faulty technique in manipulation of an empirical method will thus be eliminated.

There undoubtedly will be a marked improvement in the usefulness of the butyric acid over the Reichert-Meissl method. However, in view of natural variations in fatty acid content of butterfat determined by many years of careful studies, it is doubtful that, even with a solidly established basis of authentic data it will be possible to detect as low as 10% adulteration by this new method. It must also be borne in mind that if the blends used in such adulteration contain small amounts of added synthetic tributyrin, stated to be commercially feasible,[4] then the value of the butyric acid method is largely nullified.

So far, none of the other fatty acids have been seriously considered as a basis for checking the purity of butterfat. Iso-oleic acid occurs in hydrogenated fats in appreciable quantities and under certain conditions can be used to demonstrate the presence of these fats. However, analytical methods are unsatisfactory for the small quantities that would be present at the lower levels of adulteration. The method, of course, would not be satisfactory for coconut oil or other unhydrogenated fats.

Differences in triglyceride structure have been studied by several groups, in efforts to demonstrate the effect of added foreign fats. Keeney[4] has proposed using differences in appearance of crystals separated from an isopropyl-ethyl alcohol solvent. However, several other laboratories have not had much success with this method.

Another proposed crystallization method, without the use of solvents, depends on obtaining fractions of the fat at 70.5 and 80 deg. F. and then comparing the Reichert-Meissl values of these fractions.[5] A third method, proposed by Bhalerao and Kummerow,[6] depends on separation of the fat into alcohol soluble and insoluble fractions. Refractive indices of one of these fractions showed an average difference of 0.0008 from butterfat (20 authentic samples) when 10% of foreign fat was present.

In all of the proposed glyceride methods these researchers have observed distinct differences between pure butterfat and adulterated samples, although in some cases these differences are noted as rather small. It is known that because of the complexity of natural fat composition and the close similarity in the physical properties of the triglycerides, reproducible results in crystallization procedures are difficult to obtain.

Unsaponifiable Constituents

Even with elaborate constant temperature equipment similar fractions in different samples of the same fat show variations in their composition. These fractions are almost always mixtures of closely similar triglycerides. In the absence of solvents, the separated fractions show greater complexity and variations. It is, therefore, unlikely that tests made by this procedure can be as satisfactory for low-level adulteration as tests based on the isolation of specific components.

Furthermore, it is not likely that the sharp differences obtained from the examination of a limited number of samples will be sustained upon examination of the large number of samples necessary to provide a proper foundation for a legally reliable method. It is this writer's opinion that tests based on triglyceride differences may be useful as "sorting-out" procedures for higher levels of substitution, probably around 25%.

It does not seem probable that any of the proposed triglyceride tests can be used to detect 10% adulteration with the certainty required for presentation in court.

The small proportion of non-glyceride material in fats cannot be made into soap, and hence is called unsaponifiable matter. This fraction contains many different substances, including sterols, vitamins A, D, and E, carotene, alcohols, and hydrocarbons. Several tests, based on specific unsaponifiable constituents, have been

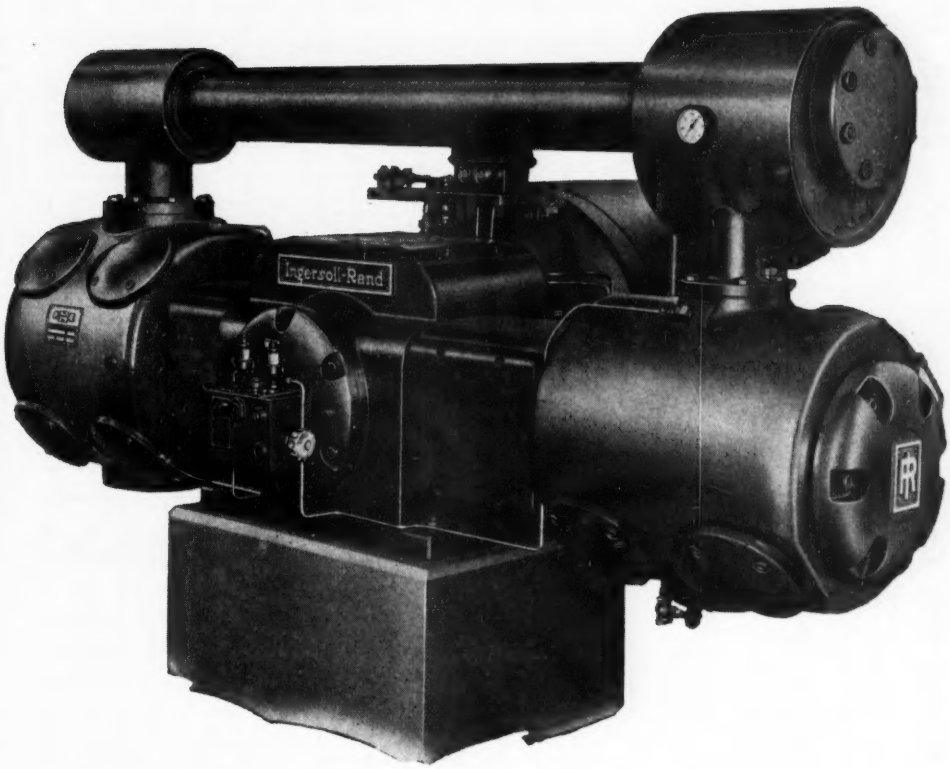
(Turn to page 155)

NEW

OPPOSED-CYLINDER

BALANCED DESIGN, TYPE PHE

COMPRESSOR



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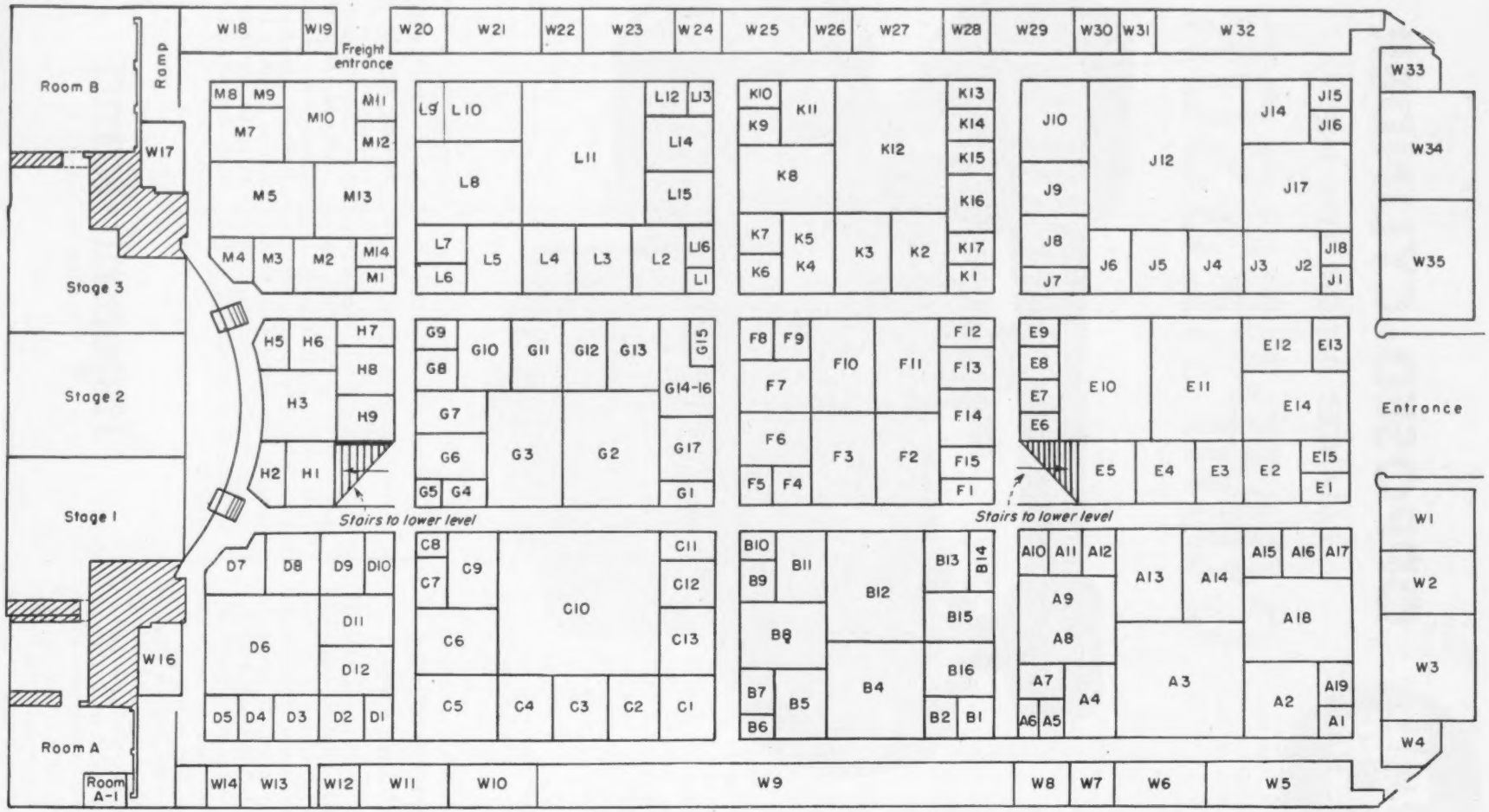
FLOOR PLANS, EXHIBITORS, DAIRY INDUSTRIES EXPOSITION

19th Show, Atlantic City Convention Hall, October 25-30, 1954



TIME OF EXHIBITS

Mon.—12–7 P.M. **Tues.—9 A.M.–6 P.M.** **Wed.—12–6 P.M.** **Thurs.—9 A.M.–6 P.M.** **Fri.—12–6 P.M.** **Sat. 10 A.M.–1 P.M.**

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Companies and Booths—Numbers Preceded by Letters Designate Main Floor Booths (Plan Above); Numbers 100—539 Represent Basement Booths (Plan on Next Spread); Booths 10—41 Ballroom Level (Plan Not Shown).

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Alloy Products Corp A-4
Alpha Aromatics, Inc W-22
Aluminum Co. of America W-10
Ambrosia Chocolate Co 520
Amcoin Corp. 312
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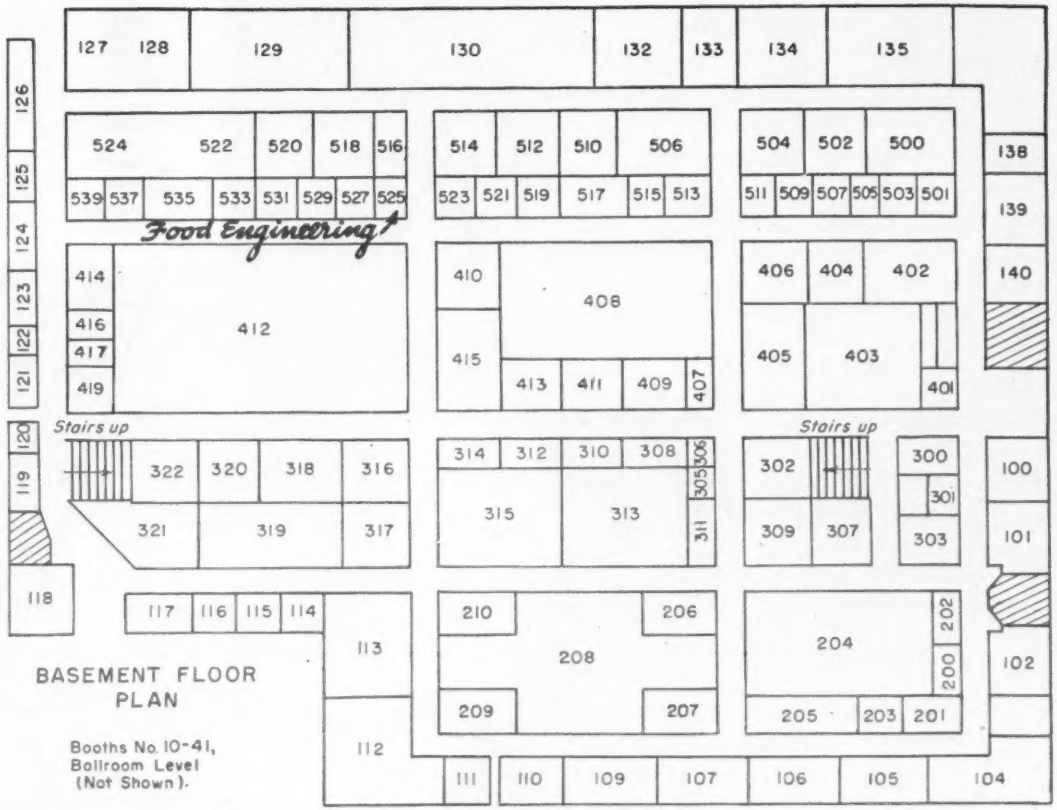

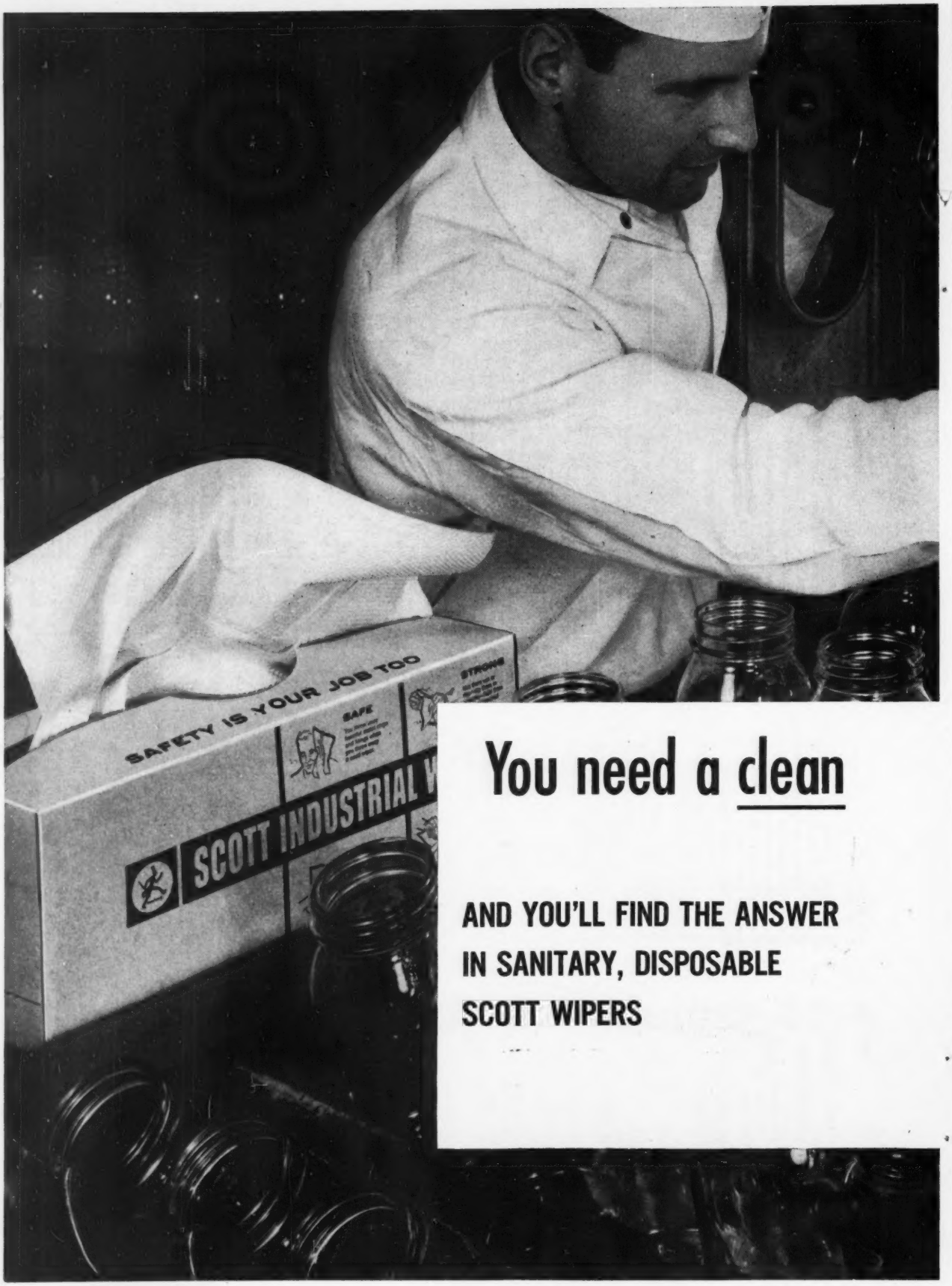

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AND YOU'LL FIND THE ANSWER IN SANITARY, DISPOSABLE SCOTT WIPERS

wiper around food and candy!

Use one thoroughly, throw it away—a clean Scott Wiper is there to take over.

You'll use them to wipe up food spillage . . . to wipe down food vats . . . to take care of the wiping needs in all departments.

Scott Wipers are packed 125 to the box. They're two-ply and tough, yet soft and absorbent. Compare them with whatever wiping material you're using now—for cost, for convenience, for performance.

The Scott representative or distributor in your area will be glad to help you set up a production-line demonstration in your plant. Call him or mail this coupon today.

Scott Paper Company, Dept. FE-1, Chester, Pa.
Please send information on Scott Wipers.

Name_____

Company_____

Address_____

City_____ State_____

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ORANGE GROVE
TO
RETAILER . . .

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For LOWER COST TRANSPORTATION of TROPICANA Fruits and Juices

TROPICANA fruit sections and juice concentrates travel all the way from grove to grocer by modern White Trucks.

The reason: Anthony Rossi, president of Fruit Industries, of Bradenton, Fla., knows he can count on White for dependability and thousands of low cost miles every year. His fleet of 40 Whites averages 125,000 miles per truck each year . . . traveling all over the United States . . . on tight schedules because Tropicana sales are going up and these refrigerated products have to move!

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White

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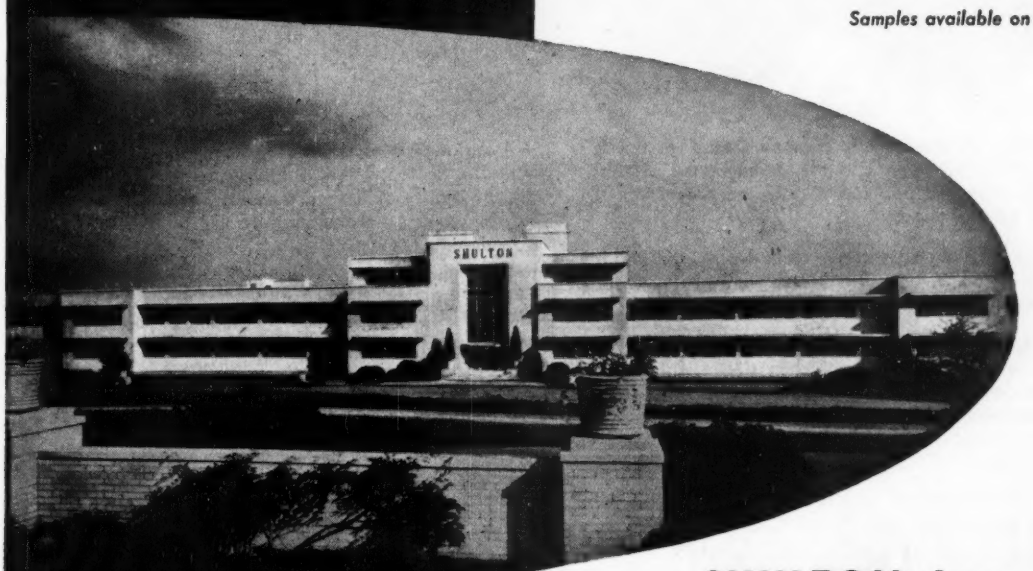
For superior ice cream flavor at lower cost...

...use *VANITROPE,* a pure, vanilla-like flavoring material exclusive with Shulton. 15 to 25 times stronger than vanillin, VANITROPE heightens the flavor of vanilla and other ice creams and effects flavor-savings up to 50% at the same time. Chocolate, butter, fruit, nut and other flavors are also benefited by VANITROPE.

Basic studies recently completed by the Dairy Experimental Station of a leading university developed proven procedures for using VANITROPE in high quality ice creams. Shulton Technical Bulletin No. 23, *available on request,* describes these tested and approved procedures.

VANITROPE (brand of propenyl guaethol) is rigidly controlled in manufacture. Now used in hundreds of nationally known food products, VANITROPE is stable in price, quality and availability. Shulton's Technical Service is available should you wish assistance in integrating VANITROPE into your formulas.

Samples available on request



SHULTON, Inc.

FINE CHEMICALS DIVISION • 630 FIFTH AVENUE
NEW YORK 20, N. Y.

Use coupon on page 233.

Turning out a sweet job in tandem!

The high quality of the famous Hershey Chocolate Bar is known far and wide. And, into the maintenance of that product's well-deserved popularity, goes the processing of just the right kind of sugar.

In the Hershey Chocolate plant eight No. 4-TH-MIKRO-PULVERIZERS set up in tandem units, turn out tons of sugar per hour, reducing it to the required degree of fineness.

It was found that this dual-pass method reduced power consumption and operating time—while delivering at the same time a product which solved other problems in the subsequent processing of the chocolate.

A major part of all the sugar in the world is ground in MIKROS. So too, MIKROS have provided the answer to a great majority of food processing operations where grinding, blending or granulating of fine or ultra-fine powders is required.

The MIKRO area of distinguished service extends far beyond the food field. It also embraces the processing of chemicals, pharmaceuticals, cosmetics, soaps, fertilizers, plastics and many other products and materials.

Submitting your grinding or dust recovery problem to the MIKRO Laboratory involves no obligation on your part. But, the answer provided may be just the right answer for you.

Write for illustrated descriptive bulletin

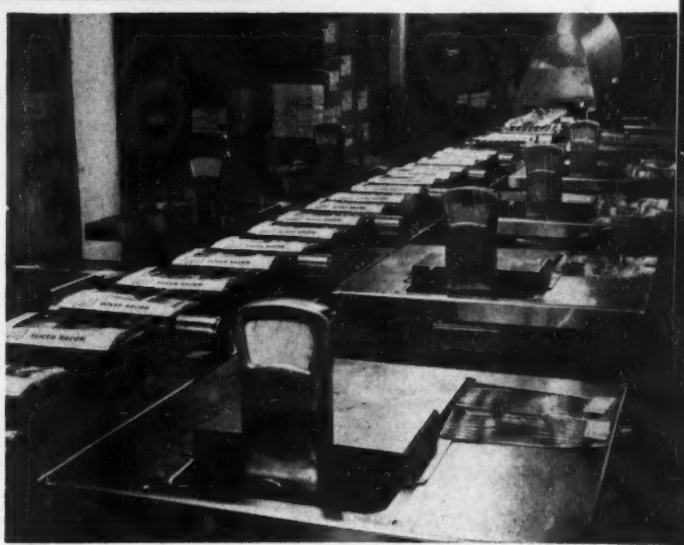
MIKRO

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
97 CHATHAM ROAD **SUMMIT, NEW JERSEY**

PULVERIZING • AIR CONVEYING • DUST COLLECTING EQUIPMENT

THIS KARTRIDG-PAK LINKING MACHINE, together with its accessory equipment, is sanitary, easy-to-clean Stainless Steel. Oscar Mayer & Co. was instrumental in developing this machine, now manufactured by the Kartridg-Pak Machine Co., Chicago.

THIS SPOTLESS BACON LINE at Oscar Mayer & Co., Chicago, makes liberal use of Stainless Steel. The high-speed slicing machine, bacon line stations, conveyor, rollers and other components – all Stainless – were obtained from the Allbright Nell Co., Chicago. Stainless Steel scales are by Exact Weight Scale Co., Columbus, Ohio.



For highest standards of sanitation

Oscar Mayer

FINDS YOU CAN'T BEAT STAINLESS STEEL

Oscar Mayer & Co., in its 71 years of growth from a small Chicago retail meat market to a nationwide meat processing organization, has constantly sought modern methods and modern equipment. That's why Stainless Steel has played such an important role in their operations.

One of the Company's major developments was the Kartridg-Pak Linker for wiener production. This linker receives a 55-foot length of stuffed cellulose casing, marks off predetermined link lengths, and twists the casing to form links. The linker has maintained production of more than 50,000 pounds for a 40-hour week. It is of Stainless Steel construction.

Like all other processing equipment in the Oscar Mayer plants, this machine is washed down daily and then scrubbed with soap and brushes and disinfected at night. Continual washing and scrubbing, to say nothing of salt in the meat, would cause a corrosion problem if it were not for Stainless Steel.

Other important applications of Stainless Steel in the plants include smoke sticks, work tables, bacon slicing machines, conveyors, rollers, scales, cook kettles, and many more. In every case, Stainless Steel has earned its place by doing a better job of maintaining top standards of cleanliness, sanitation and good appearance. It doesn't discolor, chip, or peel, and it withstands salt corrosion.

No matter what you process, there's a place in your operation where Stainless Steel can do a better job at lower eventual cost. Use it, and when you do, specify perfected, service-tested USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS USS PIPE · TUBES · WIRE · SPECIAL SECTIONS

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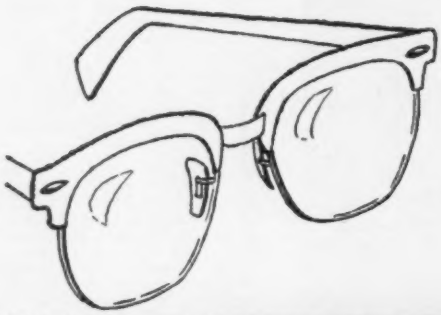
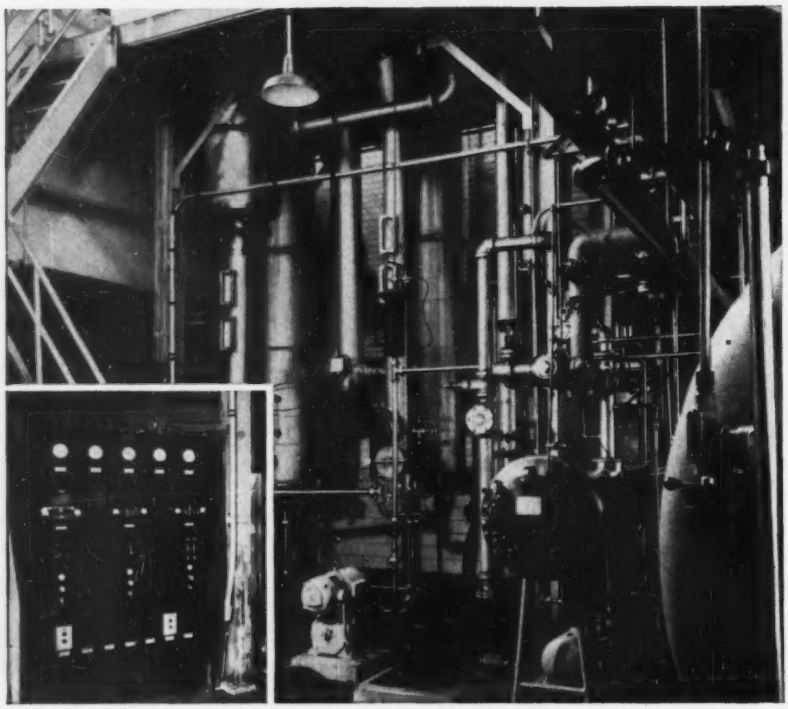
UNITED STATES STEEL



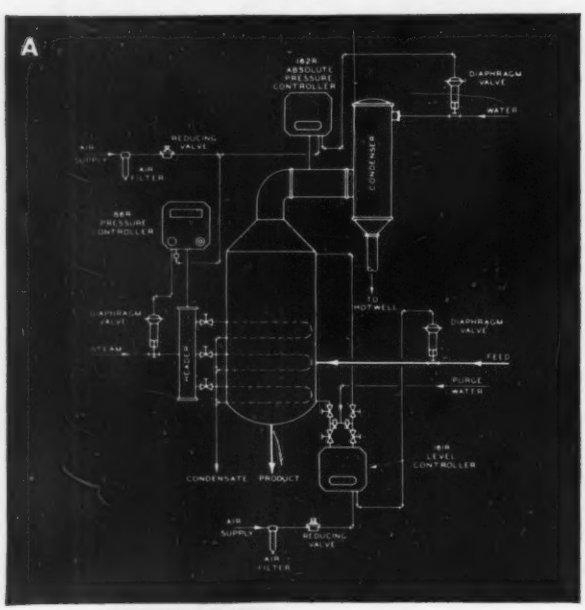
Have you ever look at Taylor's

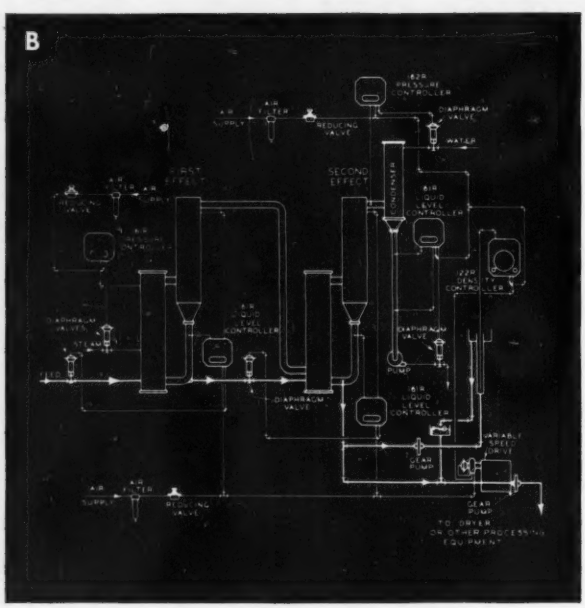


One of the expensive processes between the cow and the consumer is concentration, in the case of evaporated milk products. Taylor's Continuous Evaporator Control System reduces concentration costs by controlling three major variables that contribute to burn-on, entrainment and non-uniform operation. These three variables are absolute pressure, product level and steam pressure. On the Buflovak Double Effect Evaporator shown here, in use at Dodds Alderney Dairy, Inc., Buffalo, N. Y., all Taylor Instruments work together in close coordination to assure a premium product at low cost.

SEE OUR BOOTH
No. 106
DAIRY INDUSTRIES EXPOSITION
ATLANTIC CITY
OCTOBER 25 • 30

Right: *Buflovak Double Effect Evaporator in use at Dodds Alderney Dairy Inc., Buffalo, N.Y.*
Left: *Panel Board for Taylor Continuous Evaporator Control System.*





taken a really good money-making machines ?

YOUR stockholders will love you for it because these instruments cut costs . . . eliminate waste. Greater operative income means benefits to everyone. Just look at the job these systems can do for you:

A. Taylor Vacuum Pan Control System.
Gives a more uniform product by: maintaining uniform pressure within the pan and a constant boiling temperature, preventing fluctuations in steam pressure, thus reducing burn-on and giving a more uniform operation: regulating product feed and maintaining the proper product level, assuring maximum efficiency of the heating surface and helping to reduce entrainment and burn-on.

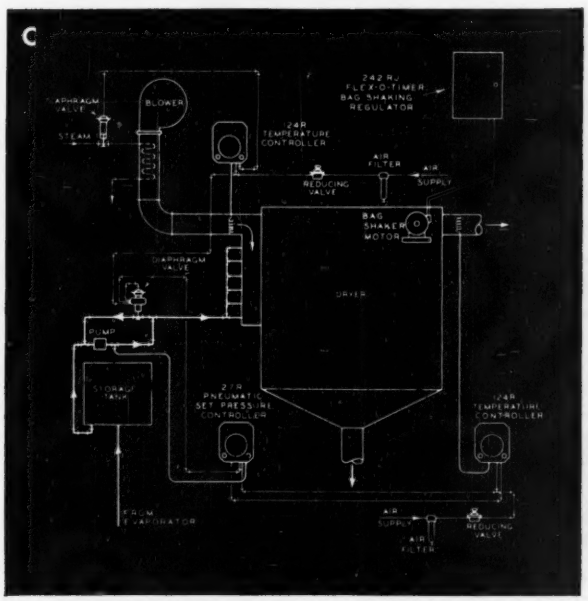
B. Taylor Continuous Evaporator Control System.
Working in perfect coordination, absolute pressure is controlled within the second effect; a constant boiling temperature is maintained; fluctuations in steam pressure are prevented; and product level is precisely controlled in each effect. Burn-on and entrainment are reduced to a minimum and you are assured of greater product uniformity at maximum efficiency.

C. Taylor Spray Dryer Control System.
A uniformly dried product results from constant desired inlet temperature. Feed to dryer is regulated to maintain constant outlet temperature. Dampers and bag shakers are operated in a definite timed sequence to prevent caking in bag. Result—maximum product drying.

D. Taylor High Temperature Short Time Control System.
Answers every requirement for the majority of dairies. All instruments are housed in a special dual-type case. The left side contains safety devices for controlling the action of the Flow Diversion Valve and milk pump. Right side contains the control mechanisms which maintain correct processing temperatures.
See your favorite Dairy Equipment Supplier and write for **Catalog 500A.** Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

Taylor Instruments
MEAN ACCURACY FIRST

C



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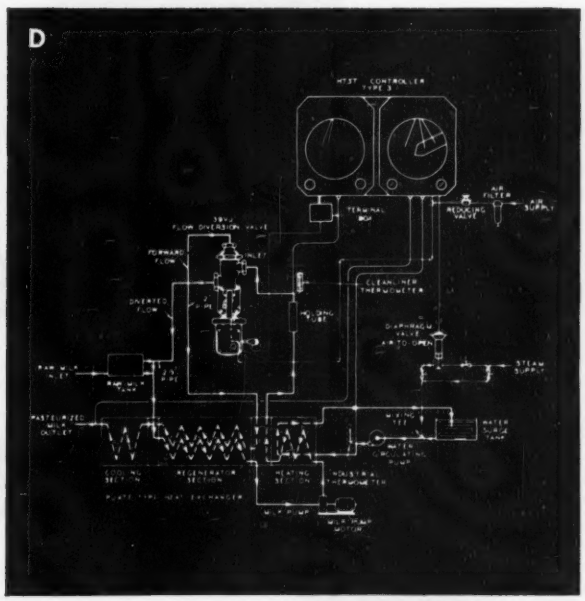

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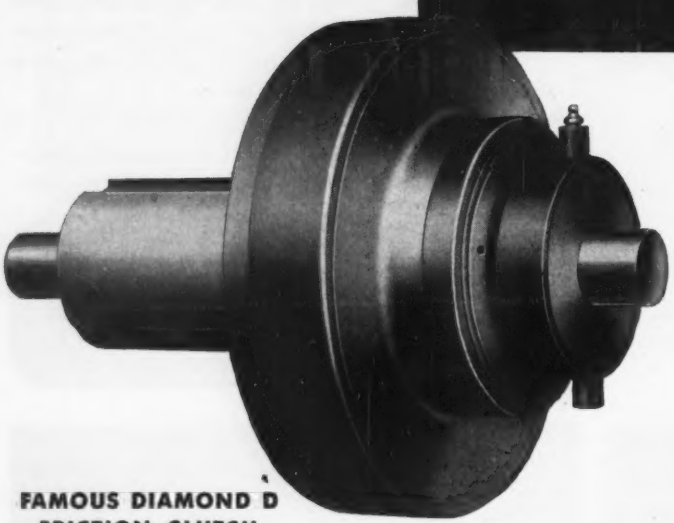
DODGE FRICTION CLUTCHES

Proved in thousands of industry's toughest jobs!

ROLLING GRIP FRICTION CLUTCH
"NO TOGGLES!"
1/3 to 21 H.P. CAPACITIES



FAMOUS DIAMOND D FRICTION CLUTCH
CAPACITIES UP TO 470 H.P.!

Look to Dodge for the clutches to meet your specific needs. Dodge leadership in the field of mechanical power transmission is strikingly evidenced in the advanced design and engineering of a complete line of friction clutches, in a full range of sizes with capacities from 1/3 hp to 470 hp.

ROLLING GRIP FRICTION CLUTCH

New and simplified design gives new ease of control with positive drive and extreme ruggedness. There are no toggles! Instead the mechanism shifts smoothly on hardened steel balls—and has the positive grip of a wedge. (Operating parts enclosed for safety yet quickly accessible for service). Available from distributors' stocks in two types—Bolted Plate or Gear Tooth Mechanism in sizes from 1/3 hp to 21 hp at 100 rpm.

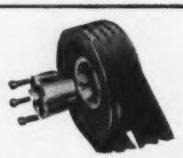
DIAMOND D FRICTION CLUTCH

Built with the stamina for grueling service, this rugged clutch has a world-wide reputation for dependability. It's compact, too—completely enclosed in both engaged and disengaged positions. Adjustment is simple—an Allen wrench at one point does the job. Available in single, double or triple friction plate design in several types of construction. Capacities from 21 hp to 470 hp at 100 rpm.

DODGE MANUFACTURING CORPORATION
2800 Union Street, Mishawaka, Indiana

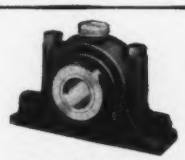
DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.



SEALED-LIFE V-BELTS AND TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCER



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DEPENDABLE COLORS
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U.S.P. Vitamins in bulk

Also available in carriers for easy, accurate and economical fortification of foods.

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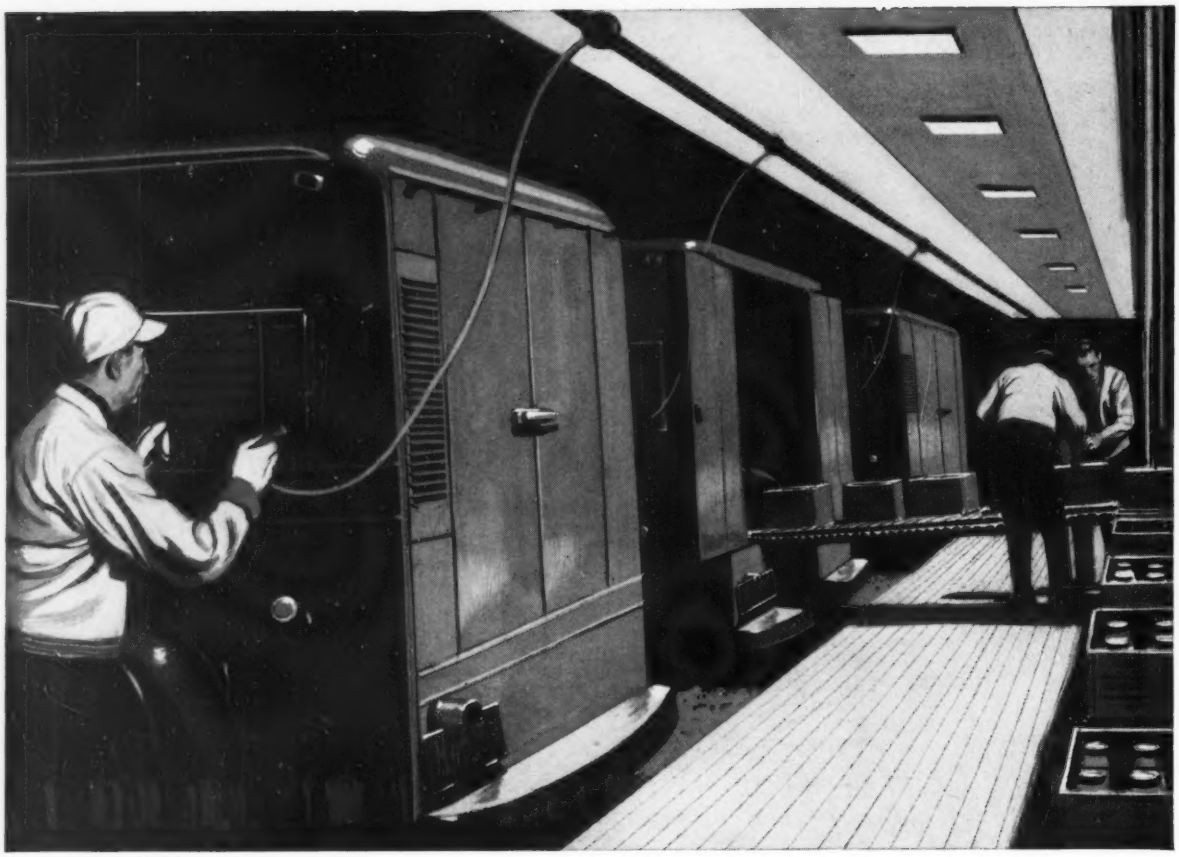
WORLD'S LARGEST SUPPLIERS OF VANILLIN



General Electric announces an electrical system for 24-hour truck refrigeration

Now you can equip your local-delivery milk and food trucks with dependable, economical 'round-the-clock refrigeration equipment. It's possible because General Electric has developed a compact new electrical system especially for operation as a truck-refrigeration compressor drive.

RELIABLE 24-HOUR SERVICE is provided because this G-E electrical system operates equally well off the engine crankshaft—delivering 100% capacity even when the engine is idling—and off 115-volt plug-in, for night-time storage.

G.E.'s SYSTEM PAYS FOR ITSELF, too. It's more convenient than ice refrigeration, won't cause truck-body rust. Small and compact, it makes possible an increase in pay load. By maintaining constant low temperatures, the G-E system reduces the waste of enroute spoilage, pleases customers by delivering your products cool and fresh.

BEFORE YOU ORDER new local-delivery milk and food trucks, be sure to discuss this versatile new G-E electrical system with your truck-body builder or truck refrigeration equipment supplier. These concerns are invited to obtain full information by contacting their nearest G-E Apparatus Sales Office.

WRITE FOR DESCRIPTIVE BULLETIN GEA-6084 to Sect. 704-39, General Electric Co., Schenectady 5, N.Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

"You see Powell Valves everywhere! And with . . .

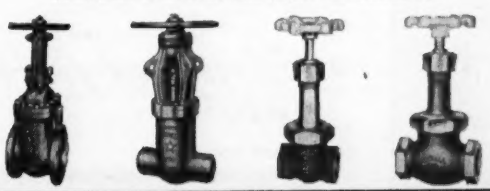
. . . good reason! They're famous for dependability. Economical, too.
What's more, Powell has a complete line."

Just name the valve needed...

. . . POWELL CAN SUPPLY IT! Small wonder—since Powell probably makes more kinds of valves and has solved more valve problems than any other organization in the world.

Available through distributors in principal cities. In bronze, iron, steel and corrosion resistant alloys. ⅛" to 30" and 125 pounds to 2500 pounds W.S.P. On problems, write direct to The Wm. Powell Company, Cincinnati 22, Ohio.

CONTROLS FOR THE LIFE LINES OF INDUSTRY



Powell Valves

108th year

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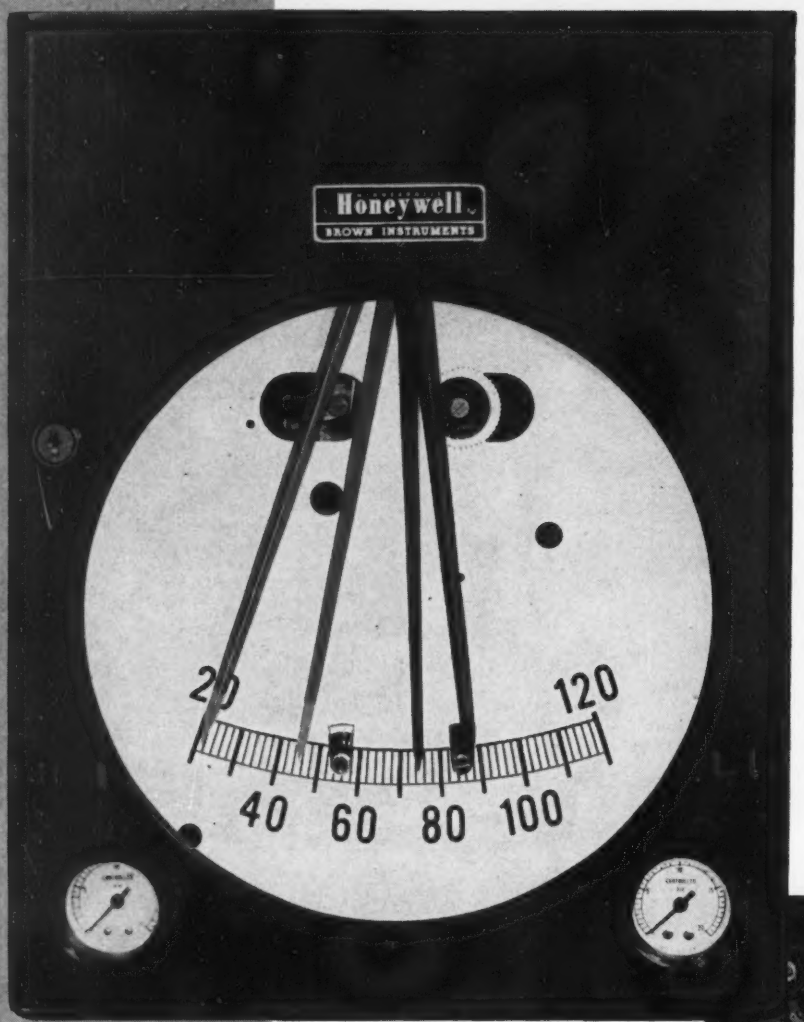

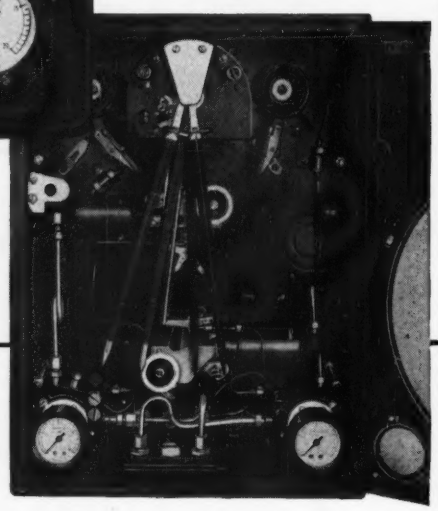

Interior view of Controller case, showing dual thermal systems and dual control units . . . all packaged into one compact, space-saving assembly.

Designed for Versatility!

Clear indication
color-coded pointers show set point and measured value for each temperature.

Choice of thermal systems
dual systems with the same actuation and range can be selected from these types: Vapor, for –40 to 600° F. . . . Gas, for –125 to 800° F. . . . Mercury (either case-compensated or capillary-compensated) for –40 to 1000° F.

For relative humidity
special stainless steel wet and dry bulbs in common armor, for ranges from 20 to 120° F.

Choice of control
any of the following combinations can be supplied: both systems on-off control . . . both systems with 10% *Throttlor* proportional control . . . or one system on-off and the other with 10% *Throttlor*.

Versatile

new instrument controls two temperatures at once

. . . ideal for bakeries, boil tanks, smokehouses

FLEXIBLE, concentrated indication and control of two temperatures is now possible, with the new Brown Indicating Thermometer Controller. This latest member of the Brown instrumentation line for food plants has numerous applications in varied processing operations.

As a combined wet and dry bulb instrument, it affords simplified control of humidity in bread-proofing rooms, bakery fermentation rooms, smokehouses, and similar air-conditioned areas. As a dual dry-bulb instrument, it centralizes control of boil tanks . . . and practically any other moderate-temperature equipment for which a temperature record is not required.

Built into a single, compact case are two independent indicating and controlling systems. Color-coded pointers indicate measured temperature and set point for each system, on an easily-read concentric scale. To accommodate a variety of equipment, there is a choice of control combinations. Both systems can have on-off control, both can have 10 per cent *Throttlor* proportional control, or one of each type of control action can be incorporated.

Thermal systems of the vapor, gas and mercury types are available to cover ranges from −125 to + 1000° F. All thermal systems are built to give the best in accuracy and dependability . . . factory-assembled with leak-proof, rugged construction features.

Your nearby Honeywell engineer will be glad to discuss how this new controller can be applied to the processing equipment which you manufacture or use. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

● **REFERENCE DATA: Write for Bulletin 6430, "New Dual Indicating Temperature Controller."**

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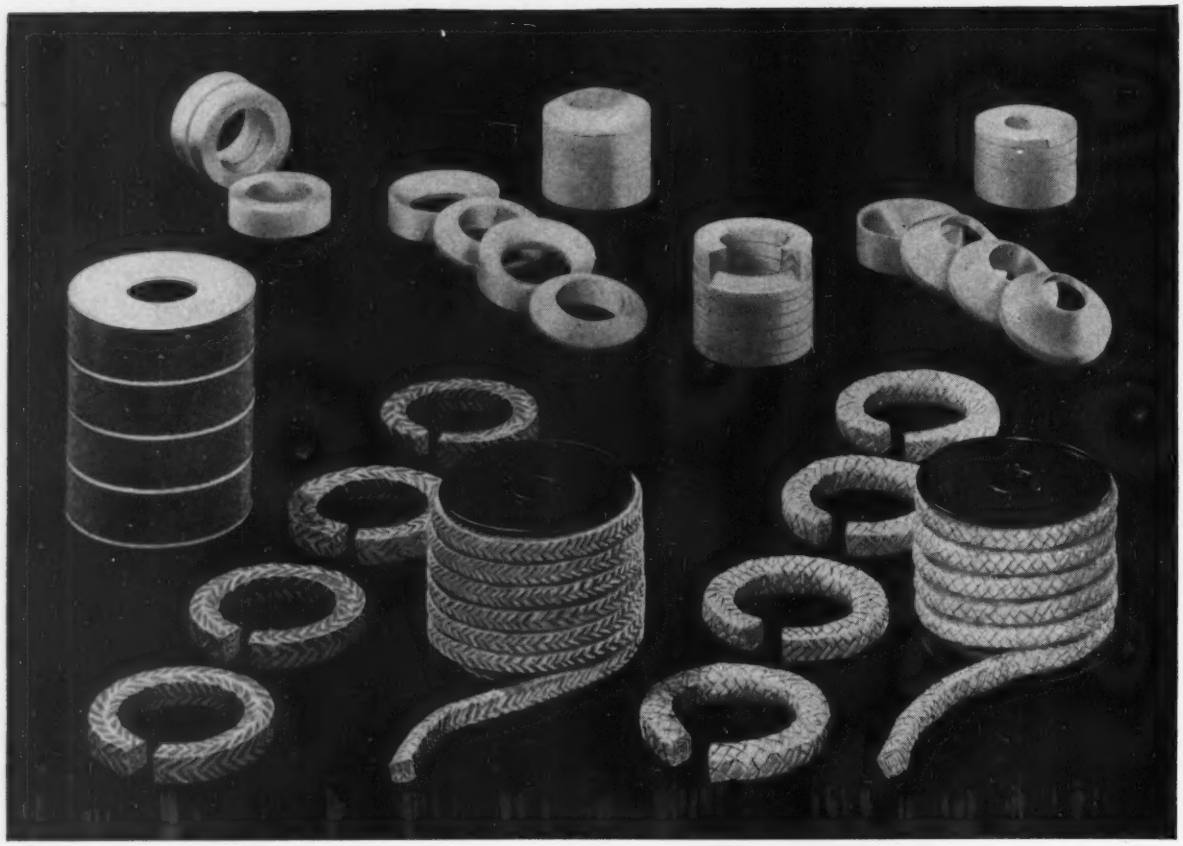
MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls



Packings made of R/M Teflon* are both non-adhesive and non-contaminating

R/M Teflon makes a particularly ideal packing material for food processing equipment because it is non-adhesive and non-contaminating. In addition, it shows no reaction against any chemicals which might be used in food processing. It is unaffected by any known industrial acids and caustics; it has no known solvent; its water absorption is zero; and weather does not affect it.

No matter what you are packing — pumps, valves, retorts, hydraulic presses, homogenizers, or what have you — R/M can supply you with the proper packing for the job. R/M No. 845, lower right in the photo above, typifies the quality of the line. This packing, made by braiding pure Teflon tape, is fabricated to permit flexibility under expansion and is recommended as a superior packing for general valve stem applications. Its ability to resist the action of corrosive liquids, acids and chemicals eliminates the need for three different types of packings.

The complete R/M Teflon products line includes rods, sheets, tubes, tape, packings, gaskets, rings, and irregular shapes. For complete information, see your R/M distributor.

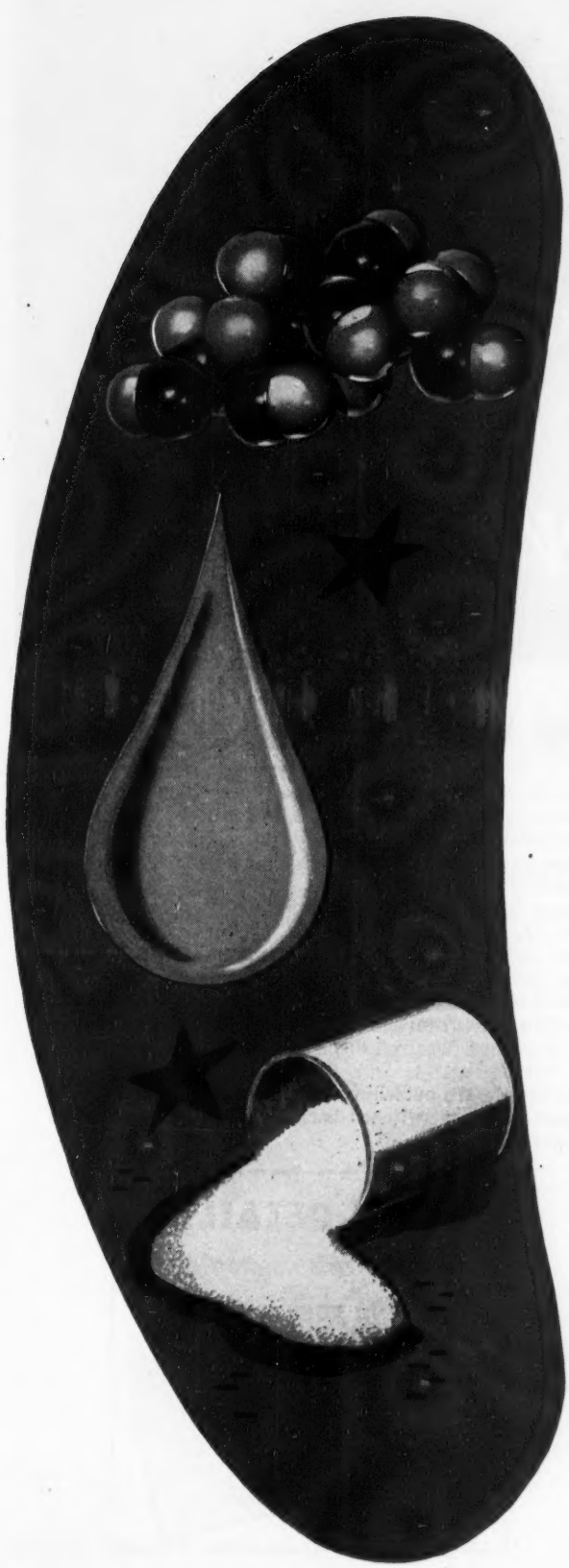
**Du Pont's trade-mark for its tetrafluoroethylene resin.*

R/M MAKES A COMPLETE LINE OF PACKINGS AND GASKETS AND SELLS THEM ONLY THROUGH AUTHORIZED DISTRIBUTORS

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, MANHEIM, PA.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada.

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowling Balls



GET ACQUAINTED WITH SORBITOL...

a wholesome food ingredient with exceptional properties

Sorbitol possesses unusual qualities as a food ingredient. Its ability to improve storage life by stabilizing moisture and retaining softness, its non-volatile nature, mildly sweet flavor and established nutritive properties have encouraged widespread examination by food technologists. It has been found to give improved characteristics to a variety of food products.

A naturally occurring ingredient of many edible fruits and berries, sorbitol is made commercially by hydrogenating common sugars. It is produced in quantity by Atlas at economical cost, by the hydrogenation of corn, cane and beet sugars. It is available as SORBO® (70% solution) and as crystalline powder or pellets.

For samples and technical assistance in application to your own product, write or call Atlas today.

FOOD INDUSTRY DIVISION

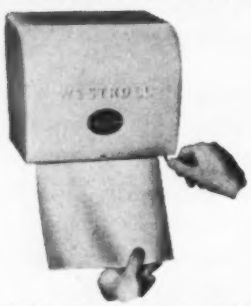
ATLAS

CHEMICALS DEPARTMENT
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, CANADA

Use coupon on page 233.

eliminate towel waste with WESTROLL!



The Westroll towel dispenser has relatively few working parts, so its maintenance factor is negligible. Westroll dispensers are streamlined, easy to keep clean. They assure a constant supply of towels, help keep washrooms spic and span, save costly janitors' time.

It's human nature to take advantage of an overly generous paper towel dispenser. Particularly so with interfold or flat towels where two, three or even four are used for one drying. But with Westroll, people tend to take just enough and no more. You save as much as 40% on towel costs.

Tests show Westroll users average only 17 inches of paper, against 22, 33, or 44 inches of interfold. Users can crank out exactly the amount of towel necessary – even as little as two inches for lipstick removal! These are immediate savings.

You also save on maintenance. One filling of a Westroll micromatic dispenser is equivalent to *four* fillings of the ordinary flat-towel dispenser. Westroll dispensers are loaned and maintained by West.

Westroll towels are outselling our interfold towels 20 to 1. No customer has ever switched back to interfold towels after trying Westroll!

WEST DISINFECTING Company

42-16 West Street, Long Island City 1, N. Y.

WANT DETAILS?

Tear out this coupon and mail with your letterhead

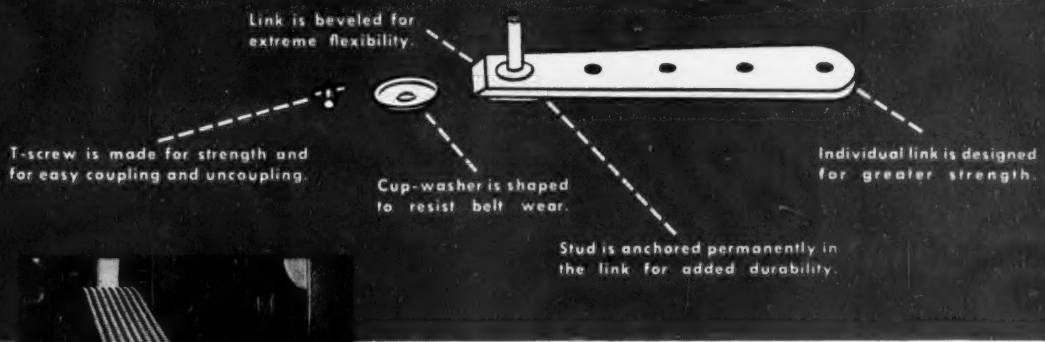
Dept. 8

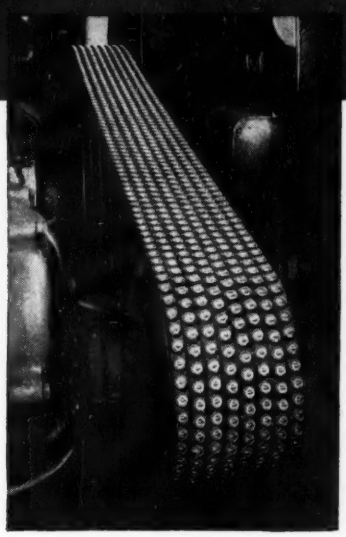
I'm interested in:

☐ A FREE leaflet on WESTROLL.

☐ A talk with a West expert about my washroom problems. No sales pitch. No obligation. Just discussion and a demonstration if I want it.

This detailed line drawing of the new, patented Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job . . . easier!


Link is beveled for extreme flexibility.
T-screw is made for strength and for easy coupling and uncoupling.
Cup-washer is shaped to resist belt wear.
Stud is anchored permanently in the link for added durability.
Individual link is designed for greater strength.



New VEELOS

TD and TE Adjustable V-belt

So easy to couple *it installs in minutes*

So strong and durable *it lasts for years*

The new Veelos TD and TE adjustable v-belt is the successful development of a specific v-belt designed for a specific service—D and E drives.

This new Veelos TD and TE v-belt has these basic advantages . . .

It simplifies installation. Links are quickly joined by easy-to-use cup-washers and T-screws to make up individual belts. It's the easiest v-belt to couple and uncouple ever developed. And you don't need to waste time removing outboard bearings.

It lasts longer—is more flexible. New high-tensile strength link combined with new stud, cup-washer, and T-screw gives added durability. New link construction provides maximum flexibility for cooler, wear-resistant running.

Get the complete story of this great new v-belt for D and E drives. Send coupon now for new 8-page illustrated catalog.

VEELOS
THE LINK
V-BELT

Veelos is known as Veelink outside the United States.

MANHEIM MANUFACTURING & BELTING CO.
605 Manbel St., Manheim, Pa.

Please send copy of your new Veelos TD and TE v-belt catalog.

Name .....

Company .....

Address .....

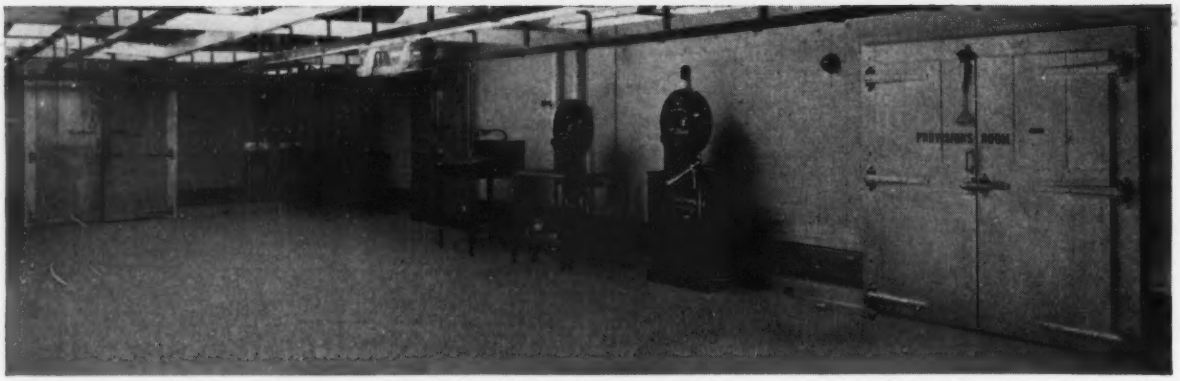
.....

SGT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Use coupon on page 233.

DAIRY SPECIAL



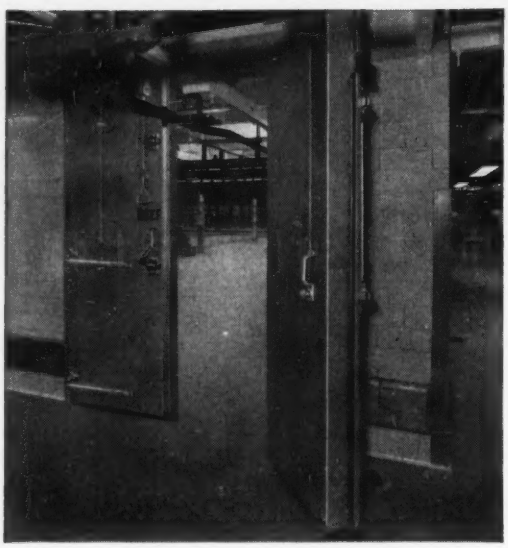
SAFEWAY STORES New Meat Warehouse

in Kansas City Speeds Handling Assures Maximum Sanitation with JAMISON Doors

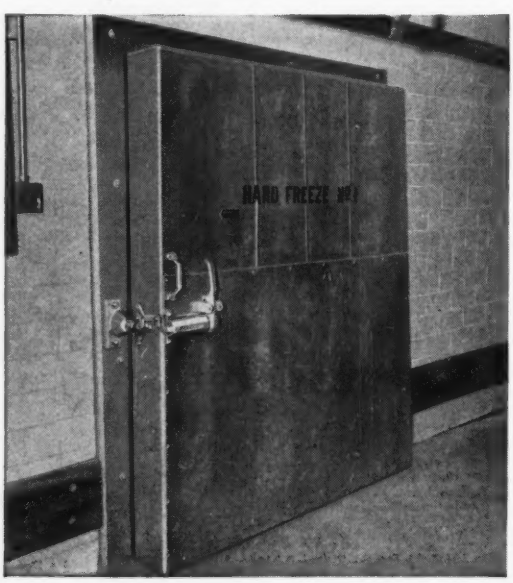
At its huge Distribution Center in Kansas City, Kansas, Safeway Stores protect the pocketbooks of customers through streamlined handling methods . . . safeguards their health by following the best sanitary measures.

Jamison Doors play a substantial part in this successful operation. Their great width accelerates traffic by giving plenty of clearance. Because they're completely metal-clad, they match the sanitary tile walls in ease of cleaning and attractive appearance.

Jamison Doors of standard or special design can also be supplied to meet your cold storage requirements. For additional information, consult your architect or write to Jamison Cold Storage Door Company, Hagerstown, Maryland, U.S.A.



The Extra Elbow Room Offered by Double Doors keeps traffic moving easily.



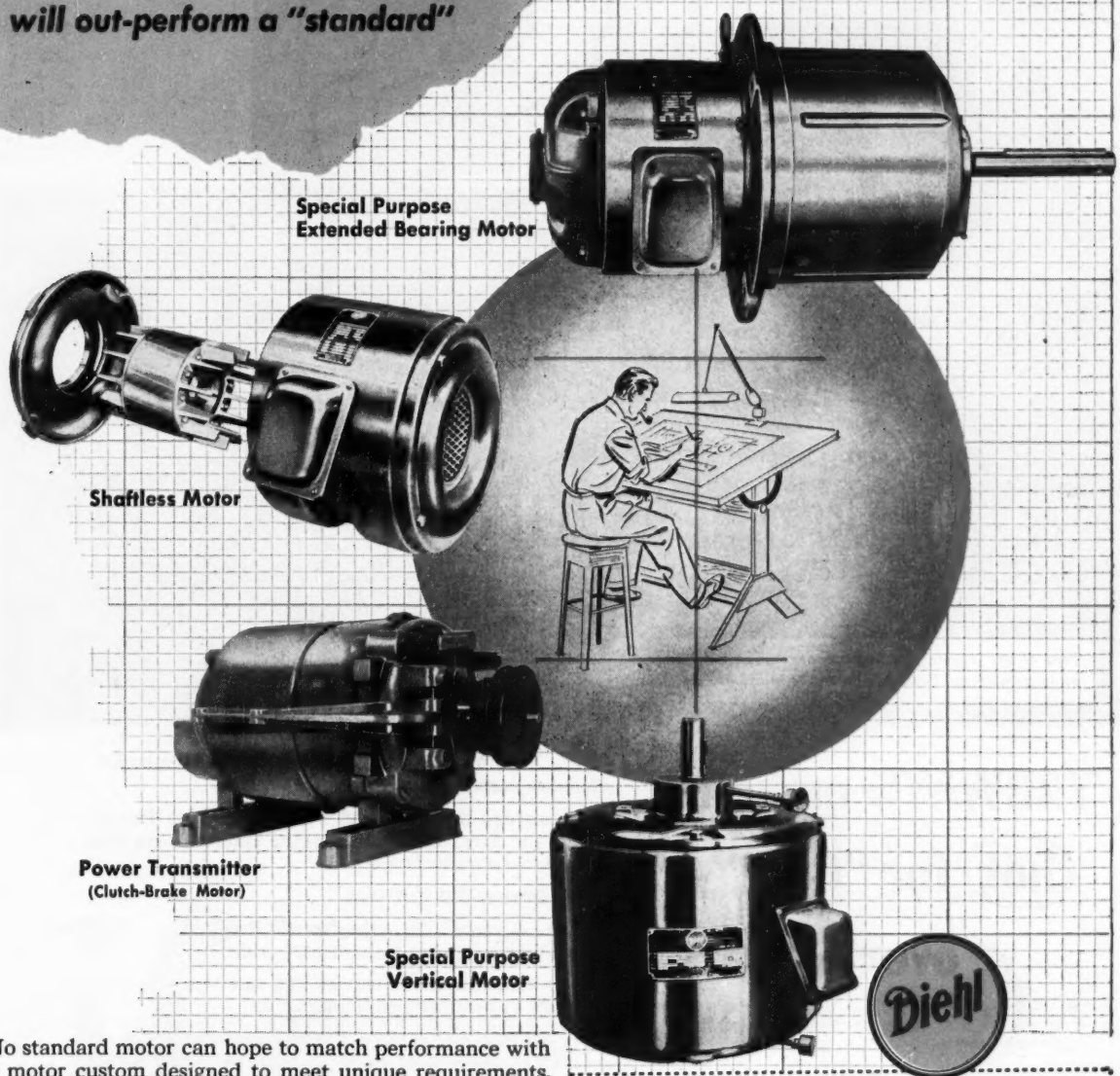
JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

a motor designed for its job

will out-perform a "standard"



No standard motor can hope to match performance with a motor custom designed to meet unique requirements.

That's why Diehl lays so much emphasis on custom construction . . . why, through the years, it has geared its abilities and its facilities, its design, engineering and manufacturing functions for maximum cooperation with its customers . . . whatever the application.

DIEHL **custom-tailored motors can:**

Cut costs • Save space • Reduce weight • Improve safety
Simplify design • Speed production • Improve appearance

When you want a fast, thorough answer to an unusual motor problem it will pay you to consult Diehl. Name your conditions . . . Diehl will design and build to match.

DIEHL MANUFACTURING COMPANY
Electrical Division of THE SINGER MANUFACTURING COMPANY
Finderne Plant, SOMERVILLE, N. J.

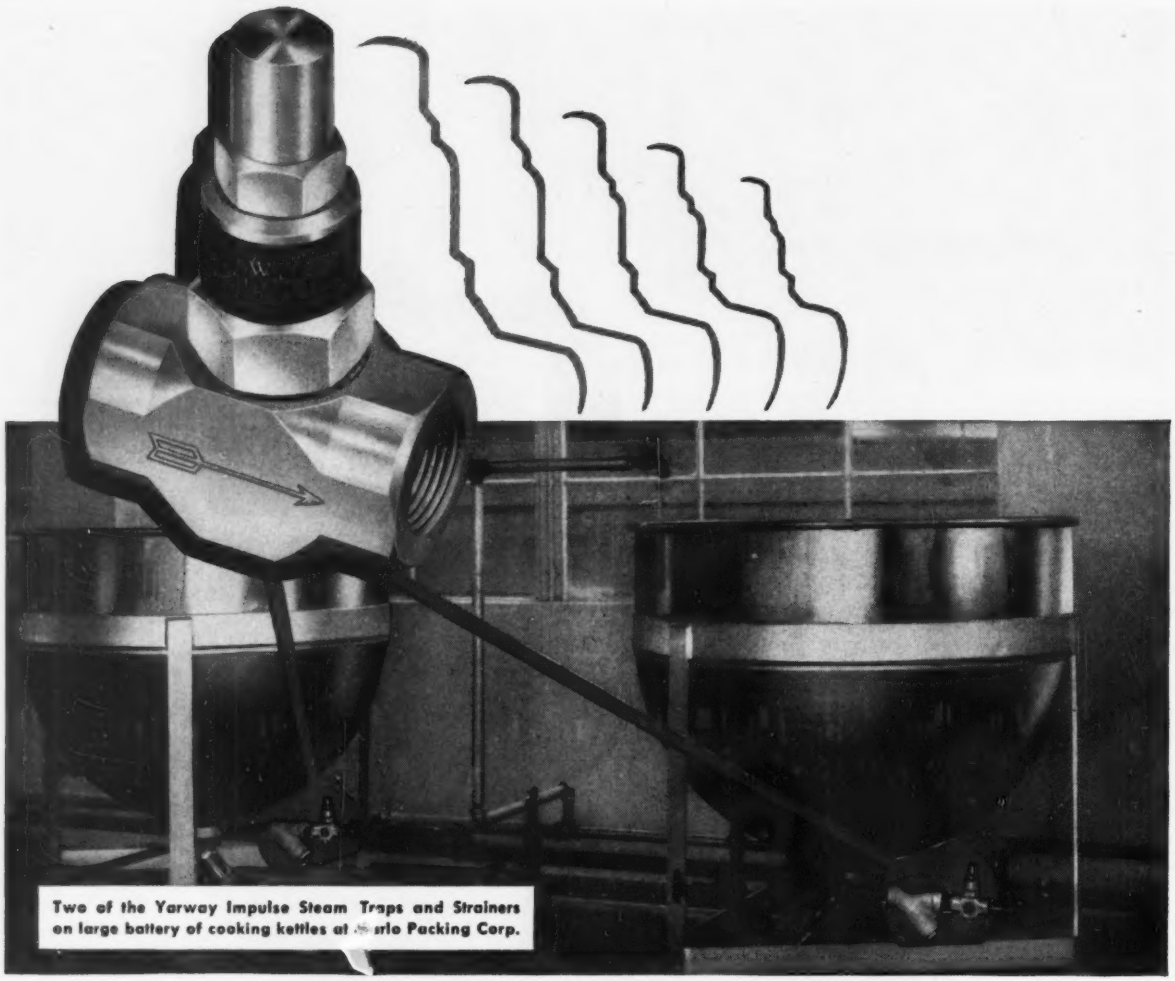
Please send me the following bulletins:
☐ New Type "D" Motor Bulletin No. FE—3304
☐ Consolidated Catalog & Price List No. FE—3310

Name_____
Company_____
Street_____
City_____ State_____

INTEGRAL AND FRACTIONAL HORSEPOWER MOTORS ARE AVAILABLE IN A WIDE RANGE OF TYPES AND SIZES

Use coupon on page 233.

DAIRY SPECIAL



Two of the Yarway Impulse Steam Traps and Strainers on large battery of cooking kettles at Marlo Packing Corp.

YARWAYS make it (hot) for "Chili"— over 6 years

Marlo Packing Corp. in San Francisco is famous for chili con carne.

Six years ago they installed Yarway Impulse Steam Traps and Strainers on all cooking kettles to get that chili *hot in a hurry.*

The Yarways did just that.

Today—6 years later—they're *still* doing it . . . the same traps, with not even a spare part added!

That's evidence of the service you can expect from Yarway Impulse Steam Traps.

Only *one moving part* in a Yarway Impulse Trap—a small stainless steel valve. It *floats on the condensate load,* discharges condensate as it forms, keeps heat at the peak!

Other advantages—small size, lightweight, low cost, stainless steel body and parts, quick delivery from 250 local distributors. For name of nearest one, and free trap catalog, write . . .

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

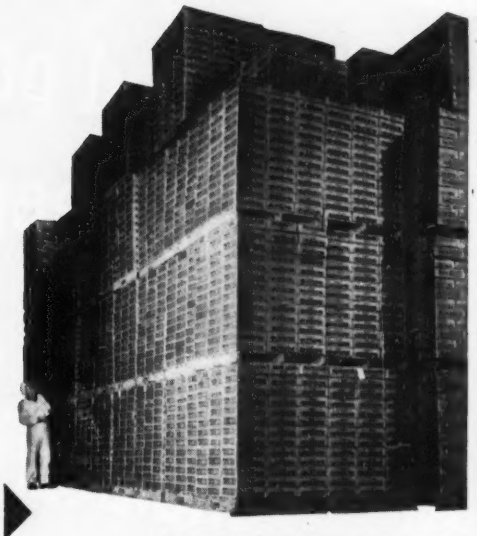
YARWAY

impulse steam traps

and Yarway Fine Screen Strainers

Use coupon on page 233.

This new booklet



. . . can show you how to do this

This tower of cases represents a typical eight-hour day's output—242,000 jars of baby food—on a Pfaudler RP-21 Piston Filler at Beech Nut Packing Co.

. . . and answer these questions:

Exactly how does a rotary piston filler operate?

- Diagrams and explanation show you how!

How can I lower the cost of cleaning food fillers?

- Booklet shows you how 1 man, using no tools, can do the job in less than ½ hour!

Can you guarantee the speed of filling my products?

- Typical chart gives examples of guaranteed filling speeds!

What fillers are available, and what jobs are they designed for?

- Six well-organized pages on filler operation and accessories give you all the answers!

if *you mail this coupon . . . today!*

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK

Engineers and Fabricators of Food Processing Equipment

Gravity Fillers	Steam Peelers	Vacuum Pans
Piston Fillers	Deaerators	Evaporators

THE PFAUDLER CO., Dept. FE-9, Rochester 3, N.Y.

Please rush me a copy of your new rotary piston filler booklet No. 911.

☐ I am working on a problem in filling.

☐ I want to bring my literature library up to date.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

Use coupon on page 233.

DAIRY SPECIAL

How food packages are keeping goodness in... air and moisture out

WITH

DU PONT ALATHON*

POLYETHYLENE RESIN

WARM SOUTHERN WEATHER was tough on lard packages—until the manufacturer started using an inner-wrap coated with ALATHON. Now his packages stay clean and attractive, his product stays fresh to attract and hold customers.

NATURAL MOISTURE of meat scraps is retained by a coating of ALATHON on the inside of this multi-wall kraft paper valve bag. Other advantages of coatings of ALATHON are quicker chilling, lower storage and lower handling cost.

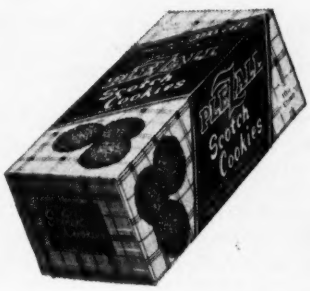
FLOUR MIX, in a multi-ply bag with a 20-lb. inner coating of ALATHON, no longer loses shortening through "bleeding." And with moisture-resistant coatings of ALATHON, bags stay fresh and clean-looking, contents stay uniform . . . bag after bag.

PACKAGED PICKLES require a container that's transparent and retains aromas and acid liquids. This manufacturer wraps his dills in a tough, laminated pouch of cellophane lined with ALATHON . . . finds they catch the eye *and* the customer.

TANGY FRUIT FLAVORS of gelatin dessert quickly vanish if the product is exposed to air. A ½-mil coating of ALATHON on the inside of a heat-sealed paper pouch bag guards volatile flavor, keeps the powder dry . . . all the way to the consumer's kitchen.

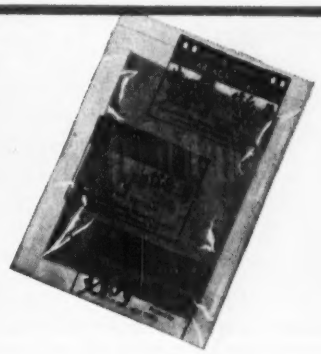
PRODUCED, FILLED AND SEALED automatically, this single-service frozen juice bag is made of laminated cellophane and ALATHON. The lining of ALATHON permits sure sealing, stays flexible at 100°F. below zero, prevents dehydration of contents.

TOUGH, MOISTURE-RESISTANT inner wrapping of 40-lb. wet strength kraft coated with a ½-mil layer of Du Pont ALATHON protects the freshness and appearance of these frozen meats. Such wrappings stay flexible at sub-zero quick-freezing temperatures.



OVERWRAP AND INNER LINER were discarded when this baker started using ALATHON in his cookie packages. An .020" boxboard carton with an inner coating of ALATHON now keeps cookies fresh and tasty longer, cuts labor, inventory and machinery costs to a minimum.

COMPLETE MOISTURE PROTECTION is essential to prevent caking of powdered milk in single-service bags. To guard their product, this dairy company uses a 1½-mil coating of Du Pont ALATHON on laminated pouch bag of sulfite paper and aluminum foil. Now powdered milk *stays* dry.



HALF AN OUNCE of soy sauce in a bag —another single-service packaging made possible by a 3-mil coating of ALATHON on glassine. This quick-sealing and rugged pouch bag resists attack by oils in the soy sauce, yet is pliable enough to insure simple and easy opening.

*REG. U. S. PAT. OFF.

Use this coupon to get more information about Du Pont ALATHON:

DU PONT

ALATHON

Polyethylene Resin

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 5410, Du Pont Bldg., Wilmington 98, Del.

Please send me more information about lining and coatings of ALATHON. I am particularly interested in these types of packages:

- ☐ Multi-wall bags
- ☐ Single-ply bags
- ☐ Pouch bags
- ☐ Board cartons
- ☐ Board trays
- ☐ Fiber drums
- ☐ Corrugated boxes
- ☐ Fiberboard containers

Name _____

Title _____

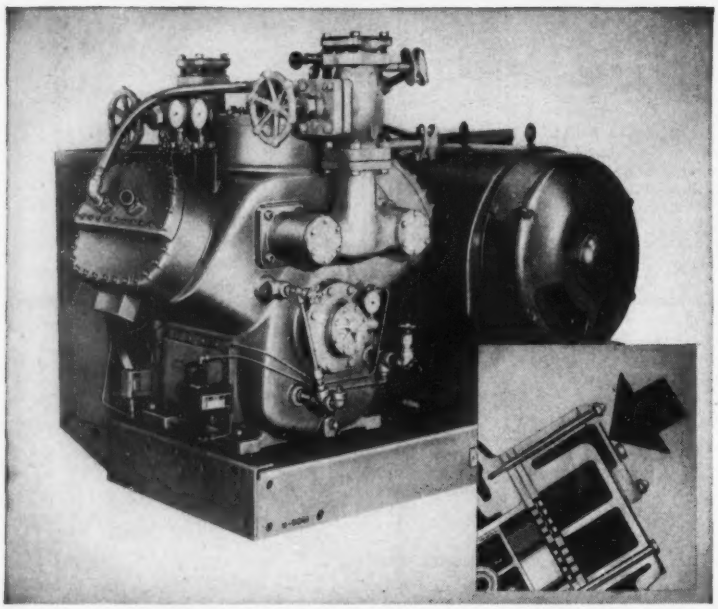
Company _____

Address _____

City _____ *State* _____

Use coupon on page 233.

Look at all the features of Worthington's new high-speed ammonia compressor



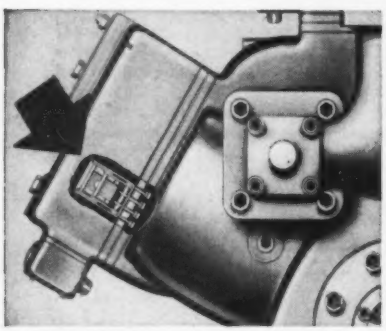
IMPROVED INTERNAL MANIFOLDING—cool suction gas completely surrounds the cylinder walls, providing longer valve life and increased overall efficiency. All passageways between suction discharge and shutoff valves are cast integrally within the crankcase, eliminating outboard fittings. Cross section shows water jacketing on one of the cylinders.

High operating efficiency and lighter weight make this modern unit the talk of the industry

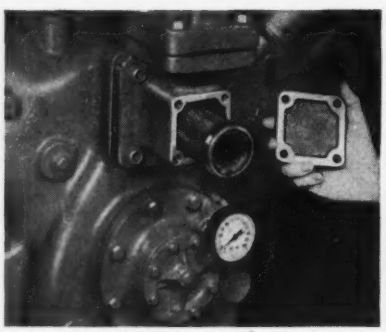
These lightweight, compact Worthington ammonia compressors have the same high operating efficiency and versatility as their lower speed counterparts.

Ranging in capacities from 18 to 150 tons, the new units can be used as high-stage or booster machines.

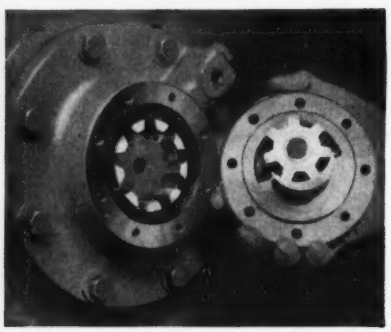
Get in touch with your nearest Worthington district office for more facts about these rugged compressors. Or write to Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.3.56, Holyoke, Mass.



ELECTRIC UNLOADING—a new achievement in variable capacity control. You can start compressor with a normal torque motor; power consumption is automatically balanced against load. Separate unloader units allow easy maintenance . . . no oil or gas pressure lines to worry about.



NEW SUCTION MANIFOLD, with cover plate over suction strainer inlet, allows easy removal of the suction gas strainer for cleaning, without disturbing any of the pipes, valves or other parts. The strainer is unique in that it fits entirely within the crankcase manifold, requiring no additional space.



NEW FORCE-FEED LUBRICATION SYSTEM—full pressure, positive lubrication, regardless of rotation. A new rotary oil pump, driven directly by the crankshaft, eliminates complicated and noisy gear trains. Oil is filtered through a strainer in the crankcase for protection of pump and other moving parts.

A.3.56

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

Photo and information courtesy of **Carboline Company,** St. Louis 19, Mo., formulators of the coating described.

How to paint a kitchen ceiling so grease will clean off easily

THE ANSWER IS EASY: use a coating based on BAKELITE Vinyl Resins.

THE PROOF IS EASY. Take the case of Medart's famous restaurant, St. Louis, Mo. Kitchen ceilings there had been painted with ordinary finishes. Within six months after a paint job the original ivory color had turned dark brown. They couldn't get the ceilings clean . . . even with caustics.

THEN, in the summer of 1949, the old paint was removed. A bonding coat was applied, followed by finishing with a coating based on BAKELITE Vinyl Resins. FIVE YEARS HAVE PASSED. The ceilings are washed once a week. Dirt and grease cleans right off. The original color and gloss remains. Quite a saving in maintenance costs.

If you would like a list of suppliers of coatings based on BAKELITE Resins (for a wide variety of uses) and a free copy of our booklet, "BAKELITE Resin Coatings for General Industry," write Dept. YQ-74.

BAKELITE
TRADE-MARK
Phenolic, Vinyl, Styrene
RESINS FOR COATINGS

TRADE MARK
BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.

Use coupon on page 233.

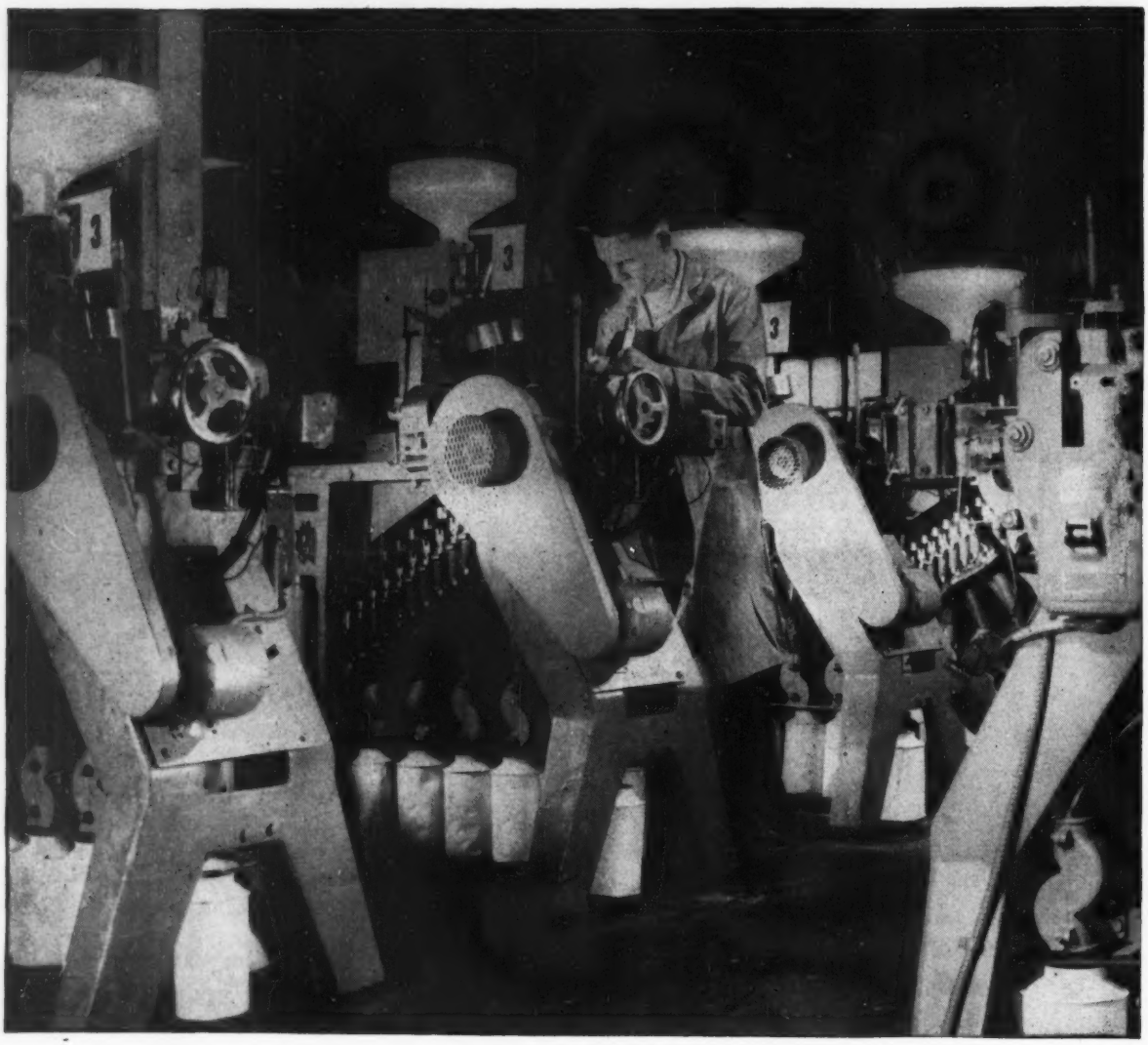
In each and every bearing, we match rollers to almost microscopic limits

NOT satisfied to finish rollers to extremely close tolerances, Timken Company engineers designed the special machines you see pictured below. They sort rollers into even more precise sub-sizes so we can match the rollers in *each* and *every* bearing to almost microscopic limits. Result: each roller carries the same load, assuring quieter operation, longer life.

This is typical of the many extra steps we take to give you more for your money than any other bearing manufacturer. In fact, only with Timken® bearings do you get *all* these advantages: advanced design, precision manufacture, rigid quality control, special analysis Timken steels. The end result is that every Timken bearing insures longer life, reduces friction and cuts maintenance costs to a minimum.

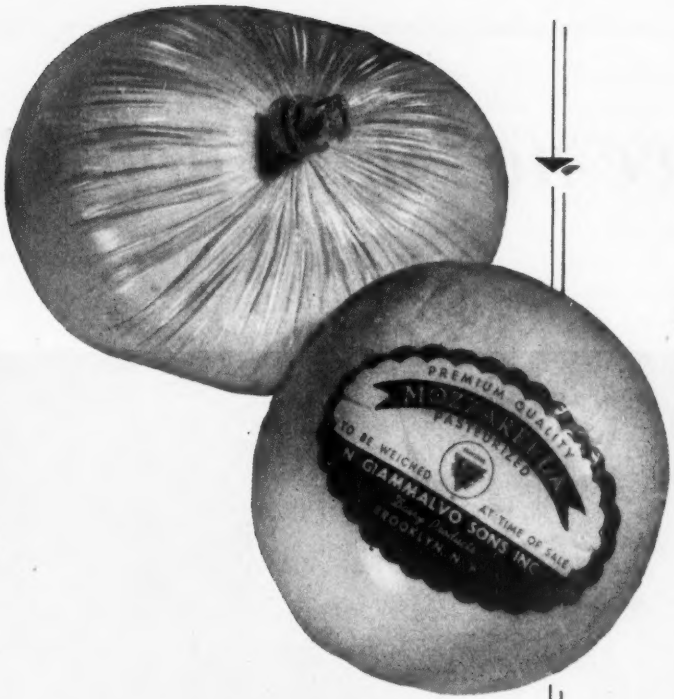
Whether you're buying or building machinery, specify Timken bearings. Or if you're replacing bearings, insist on Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

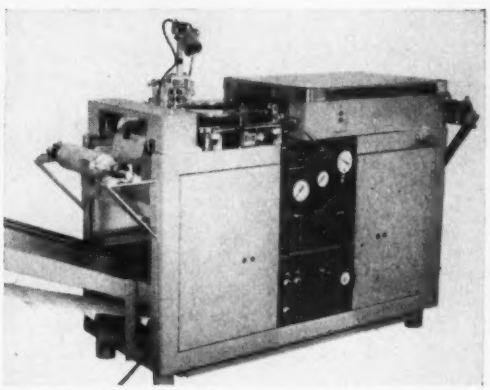


TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭
BEARING TAKES RADIAL ▯ AND THRUST ▯→ LOADS OR ANY COMBINATION →▯←



more EYE appeal
more BUY appeal
more products SELL
with
Stretchrap*



Cheese, meats, vegetables, toys and many other products in widely differing sizes are all wrapped to perfection without adjustment by the Stokes and Smith STRETCHRAP Automatic Packaging Machine.

Other irregular products wrapped on the STRETCHRAP

The versatile STRETCHRAP adds buy appeal to your products by protecting them in sanitary, airtight Pliofilm. Moisture loss is reduced, as is spoilage or handling damage. At speeds to 15 per minute, one operator packages odd shapes and sizes in an eye appealing, tight, wrinkle-free "skin" on the improved STRETCHRAP.

In a recent test, a STRETCHRAP package outsold several others by 8 to 1 . . . can you afford not to STRETCHRAP your products? Write today for complete details.

*STRETCHRAP—T.M. Stokes & Smith Co., Philadelphia, Pa. PLIOFILM—T.M. The Goodyear Tire and Rubber Co., Akron, Ohio.

STOKES & SMITH CO.
49325 SUMMERDALE AVE., PHILADELPHIA 24, PA.
Pacific Coast: SIMPLEX PACKAGING MACHINERY, INC., 534 · 23rd AVE., OAKLAND 6, CALIF.
fmc
SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION
TRADE MARK

Use coupon on page 233.

good ideas have no "office hours"

Here are ways Pfizer products are now being used to improve processing methods, or to

Vegetable fat frozen desserts gain substantial sales appeal when fortified with Pfizer Vitamin A. Nutritionally, these fortified, low cost desserts stand up favorably against more expensive desserts, giving the budget-minded, vitamin-conscious housewife the kind of product she's looking for. Moreover, Pfizer Vitamin A fortification costs as little as *a quarter cent* per gallon of vegetable fat frozen dessert.

Edible oils stay fresher longer—are protected against undesirable off-flavor, aroma and color—when processors retard oxidation with Pfizer Citric Acid. Under Standards of Identity for salad dressings, mayonnaise and similar products, Citric may replace part of the vinegar. The benefits gained are two-fold: the Citric cuts material costs and sequesters trace metals which promote rancidity.

That's why your Pfizer sales representative really lives with your problems

Good ideas don't come easily. Especially when you're wrestling with such food processing problems as *how to cut plant operation costs... increase product sales appeal... create new food products.* This requires more than a little solid thinking and "midnight oil burning." Isn't it a wise step, then to have the trained, experienced mind of a good salesman working on your problems, too?

Your Pfizer sales representative welcomes this challenge. Why? Because his success is directly related to helping achieve your successes. And to back him up and stimulate his thinking he has the Pfizer Technical Service Department and all the vast experience Pfizer has gained in working with the food processing industry for nearly a century. Why not put this thinking and experience to work for you?

add sales appeal to foods and beverages.

In fruit and vegetable juices, Pfizer Ascorbic Acid plays an important part as an antioxidant in protecting color and flavor. In combination with Pfizer Citric Acid—Ascorbic economically and effectively helps prevent browning of frozen peaches and other fruits. In the brewing of light beer and ale, Ascorbic Acid retards development of off-colors and flavors resulting from exposure to light and air.

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Manufacturing Chemists for Over 100 Years Pfizer

Whenever you have a food processing problem, talk it over with your Pfizer sales representative. He'll be glad to assist you.

An eight-foot wide Sandvik steel-belt conveyor used for handling cans of shortening. The plant where this conveyor is installed has experienced up to 25 years of satisfactory service from an earlier Sandvik conveyor installation.

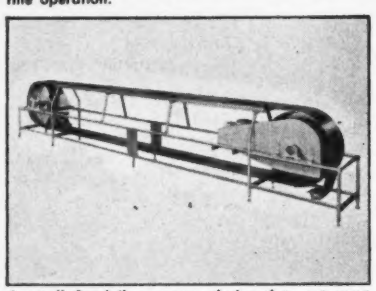
Sandvik steel-belt conveying work table makes cutting up of dressed hogs a continuous production line operation.

The smooth, impervious, easy-to-clean surface of Sandvik steel-belt conveyors has improved processing of a wide variety of foods. Here are some reasons why:

The conveying band provides a continuous, unbroken flat surface of stainless or carbon steel. — Live steam or boiling water can be applied directly. — Steel scrapers can be used for cleaning or discharge. — Withstands baking or drying temperatures. — No taste contamination. Smoothness facilitates slide handling (a vital advantage for can conveying). — High load capacity. — Long service life. — Belts can be of any length or width.

COOLING ARRANGEMENT—Sandvik conveyors can be built with a patented water-bed arrangement which cools from beneath . . . no water gets on top of the band. You can cool and convey, regulate thickness while cooling, cool and strip off gelatinous materials in sheet form, cool loose and pulverized materials, cool solids in sheet form and cool materials in layers.

ENGINEERING HELP—Sandvik's engineering department will be glad to work with you in designing a conveyor to fit your operation. Sandvik has had over thirty years of experience in designing conveyors to operate either as independent units or as integral parts of special processing equipment.



A small Sandvik conveyor designed to cut meat handling costs.

Write, wire or phone for further information.

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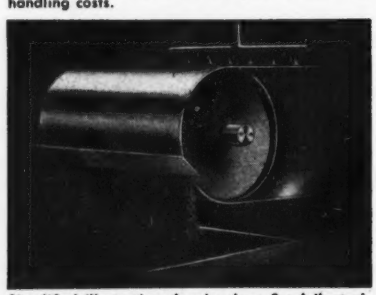
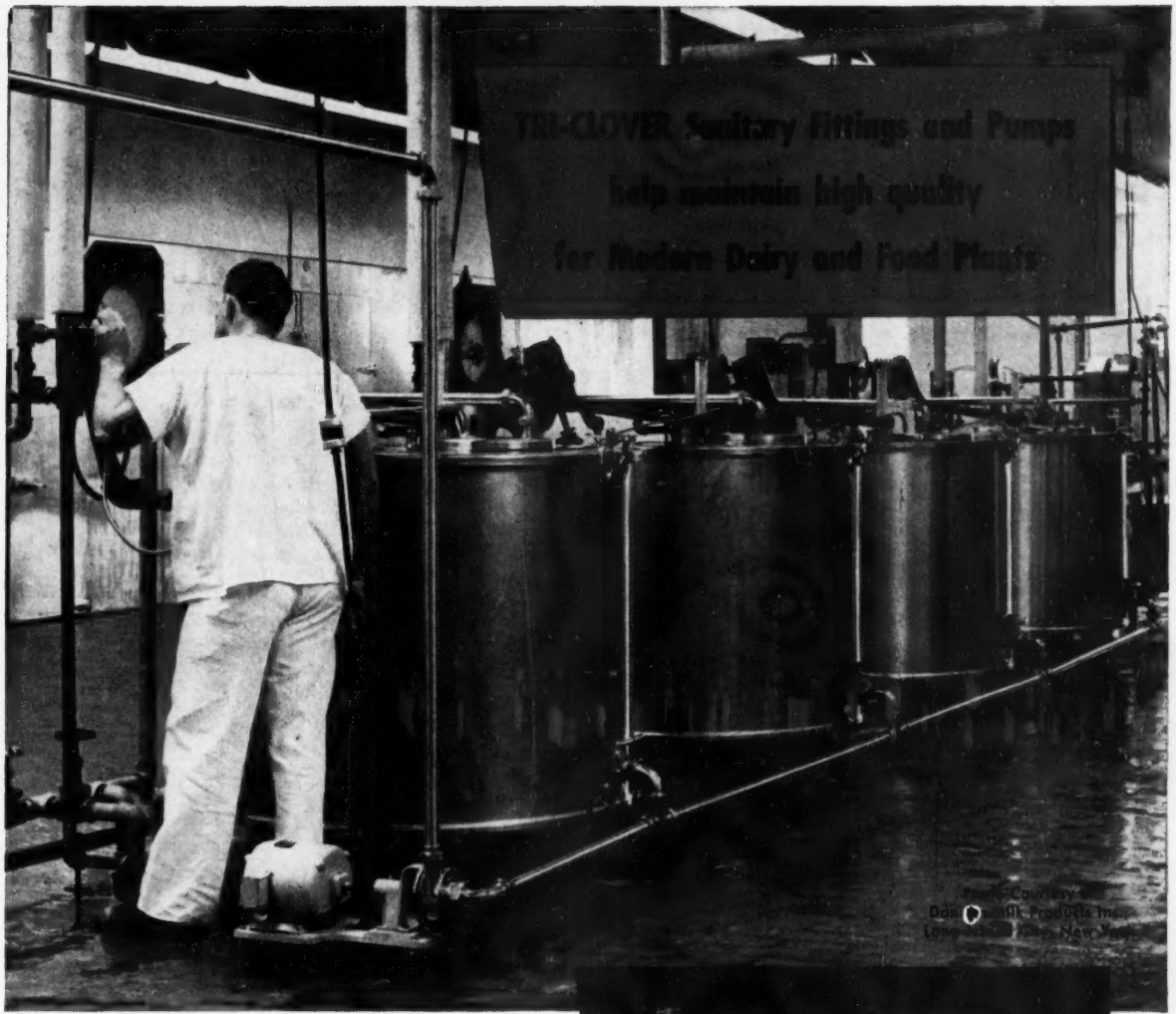


Simplified illustration showing how Sandvik steel-belt was used in a continuous vacuum drier for soluble coffee. Scraper blade removes crystallized coffee from band.



Shown on the job in *natural, sparkling clean condition* is a typical modern dairy conveying line complete with Tri-Clover Sanitary Stainless Steel Valves, Fittings, Tubing and a Sanitary Centrifugal Pump. This is the type of Tri-Clover set-up that makes it easy for the dairy industry to maintain high quality and meet exacting 3A Standards. This is the type of conveying line that makes it easy for you in the food and beverage industries to meet *your* local sanitary codes.

Features like sweep ell construction—clean cut, accurate threads—and highest quality materials and fabrication—these are the features that you need and want for your replacement or new line needs. These are the features that you get in a Tri-Clover installation!

And another important thing, Tri-Clover is equipped to handle your complete job from "tee to angle cock—from centrifugal pump to magnetic trap." *You can depend on Tri-Clover as your one reliable source for all types of sanitary fittings, valves, pumps, tubing or allied specialties.*

See Your nearest TRI-CLOVER DISTRIBUTOR
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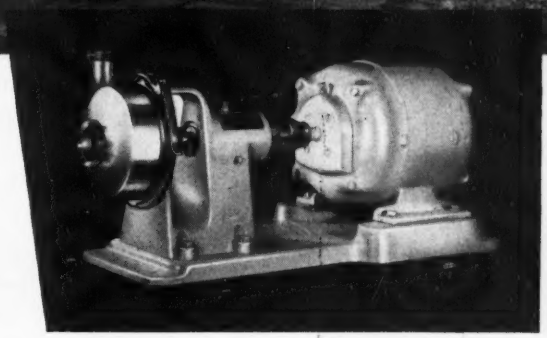

Shown above is one of the complete line of Tri-Clover Sanitary Centrifugal Pumps designed especially for use in the Dairy and Food Industries. These modern, high efficiency units are backed by years of specialized experience. For full details, send for the new Tri-Clover Sanitary Pump Catalog.

LADISH CO.
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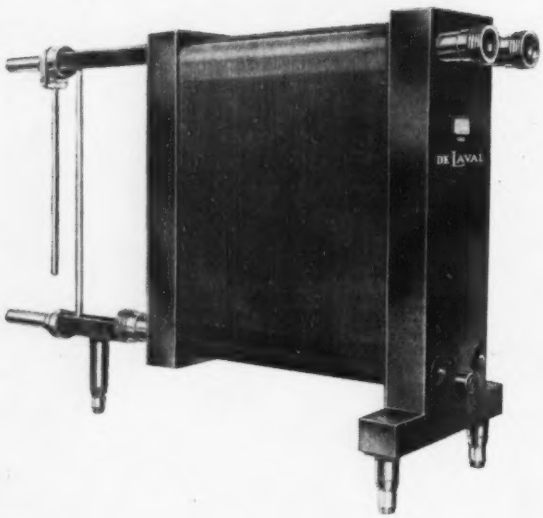
"PIN-POINT" TEMPERATURE CONTROL IN PROCESSING LIQUIDS...



For heat exchanger processing—where precise control of heating medium temperature is demanded *—no technique can match the accuracy of a De Laval Vacuum-Steam Heating System with De Laval Heat Exchanger.*

This De Laval system provides positive "hair trigger" response to each call for temperature change . . . practically eliminates time lag . . . avoids any possibility of "burn on" . . . holds the "split" between heating medium and product temperatures to extremely close limits.

The diagram at right shows how the basic principle of the De Laval system assures a uniform product quality never before achieved.

Today . . . write for complete details about the De Laval Vacuum-Steam Heating System and De Laval Plate Heat Exchangers. There are no finer.

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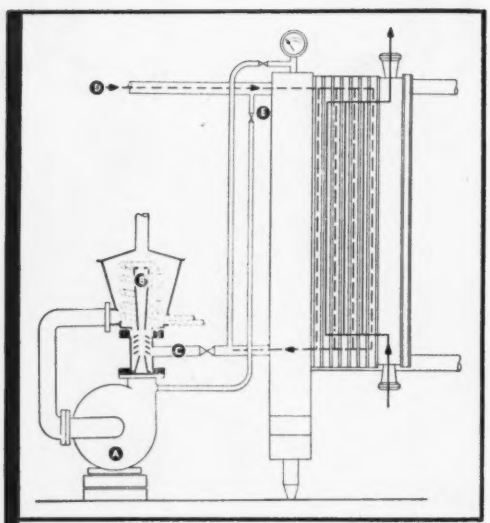

Shown above is a diagram of the De Laval Vacuum-Steam Heating System. Connecting with the steam side of the plates in the heating section is a vacuum apparatus consisting of centrifugal pump (A) which circulates water through water jet (B) in circulating tank. Jet is connected to condensate outlet (C) so that jet suction creates vacuum in heating section. This causes steam entering the unit (D) to expand to degree of vacuum thus created, and the temperature of the steam to be lowered to the desired point. Expanding steam is prevented from becoming super-heated by saturating device (E).

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PLATE HEAT EXCHANGERS

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You can probably think of a hundred and one cases where our new small truck can help you speed up your operations.

Lighter than many a baby carriage, it rolls easily, turns on a dime, stores in a minimum of room. It's husky, too—made from a special extra hard aluminum alloy that stands up under hard usage, resists dents and gouging.

You'll like its smooth finish and smart appearance. Welds are carefully ground, corners skillfully contoured for easy cleaning. Hard rubber wheels in husky swivel casters are sturdily mounted at each corner.

But take a look. See if this new economical Wear-Ever truck doesn't fill a long-felt need in your plant. Just call your dealer or send us the coupon below for full details.

Trucks also available in 1000 lb. capacities.

The Aluminum Cooking Utensil Company, Inc.,
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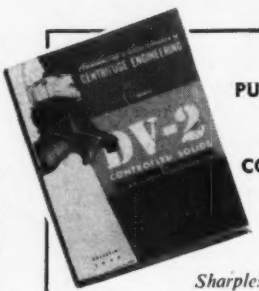
what makes them all alike?

. . . citrus juices, vegetable and pineapple juice, purees, apple juice and pectin liquor, vegetable protein, many biologicals and pharmaceuticals, and similar applications, all have one thing in common—the peak commercial product demands close control of the solids consistency and solids content.

Among the complete line of Sharples centrifuges, the DV-2 provides *external* control of solids consistency. In many applications a firmer cake can be built up by lengthening the time between valve openings, with attendant drier discharge. By adjusting the duration of valve opening, contamination of solids by liquids can be minimized, or valuable liquids may be withheld from the solids discharge. By controlling both frequency and duration of valve opening, desired concentration can be accomplished.

It will pay you to investigate the advantages of the Sharples DV-2—the nozzle centrifuge with positive, externally controlled solids discharge valves.



PUSH BUTTON CONTROL OF SOLIDS CONSISTENCY

Sharples Bulletin 1243 gives a clear picture of how the DV-2 operates, and how it can fit into your processing. Take advantage of the remarkable flexibility which the DV-2 offers. Bulletin 1243 will be sent for the asking.

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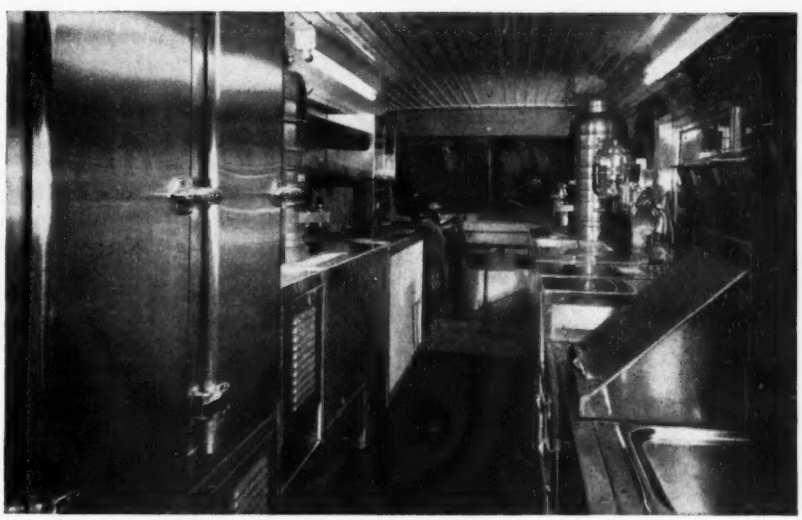

This mobile canteen, a light truck conversion by Davis & Sewell of Baltimore, illustrates some vitally important properties of Crucible Rezistal® stainless steels.

To begin with, Crucible stainless is easy to keep clean, no matter how many "hot-dogs-with-the-works" are put out every day. A quick once-over with soap and water, and the stainless keeps its new look—the surface can't chip or wear away.

Probably more important — Crucible stainless is truly a *practical shop metal.* You can bend it, draw it, spin it, weld it, machine it — do anything with stainless, in fact, that you can do with ordinary steel. At the same time, your designs can take full advantage of stainless steel's superior physical properties and corrosion-resistance to save weight without sacrificing strength.

So remember: corrosion-resistance isn't the *only* outstanding property of Crucible stainless steels. These famous alloys also feature excellent fatigue, creep and structural strength . . . high abrasion-resistance . . . resistance to high or low temperatures . . . practical workability. Let us show you how stainless can help solve some of your knotty problems. For prompt action — just call Crucible.

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DETERGENT
MILK
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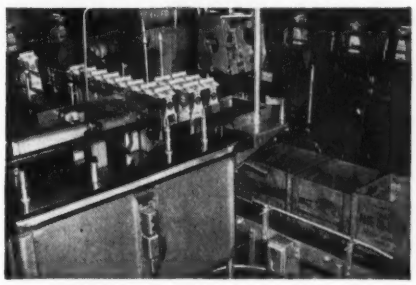
MACARONI
CIGARETTES

MORE PROFIT INTO EVERY CASE WITH STANDARD-KNAPP PACKERS

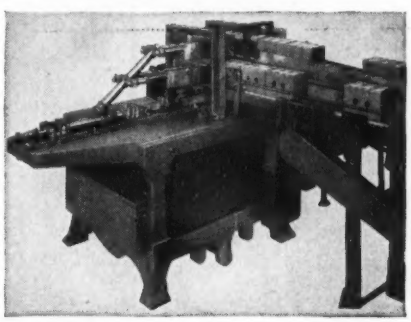
Standard-Knapp Carton Packers handle all sizes and shapes of cartons — both boxes and bags. They automatically load each shipping case exactly as required, according to almost any predetermined pattern. They pack through the end, side or top of the case. Filled cases are automatically loaded to an off-bearing conveyor and moved to a Standard-Knapp Case Sealer and Gluer. Display cases are handled as easily as regular shipping cases. Several models are also designed to load bags into bales.

In Standard-Knapp Carton Packers, precision is combined with dependability and ruggedness for low maintenance and long life. Operating speeds can be set to meet production line requirements, and cartons can be fed in single or multiple lanes. Our engineers will work with you to assure complete integration of Standard-Knapp equipment into your operations.

If you want to modernize an existing line, expand your facilities or apply automatic packing to operations now handled manually, you will want to check the many advantages of Standard-Knapp Carton Packers. Our representative will be glad to show you how S-K equipment can cut your costs. You can also get further details by writing for our catalog 800-1.



AUTOMATIC MILK CARTON CASING on Model 834 Standard-Knapp Packer in Toledo dairy demonstrates heavy savings. Production was doubled in half the time with a substantial reduction in unit cost.



ONE OF FIVE BASIC MODELS, this Model 805 Standard-Knapp Packer packs cartons or bags. Versatility of basic design permits "customized" adaptation to your requirements.

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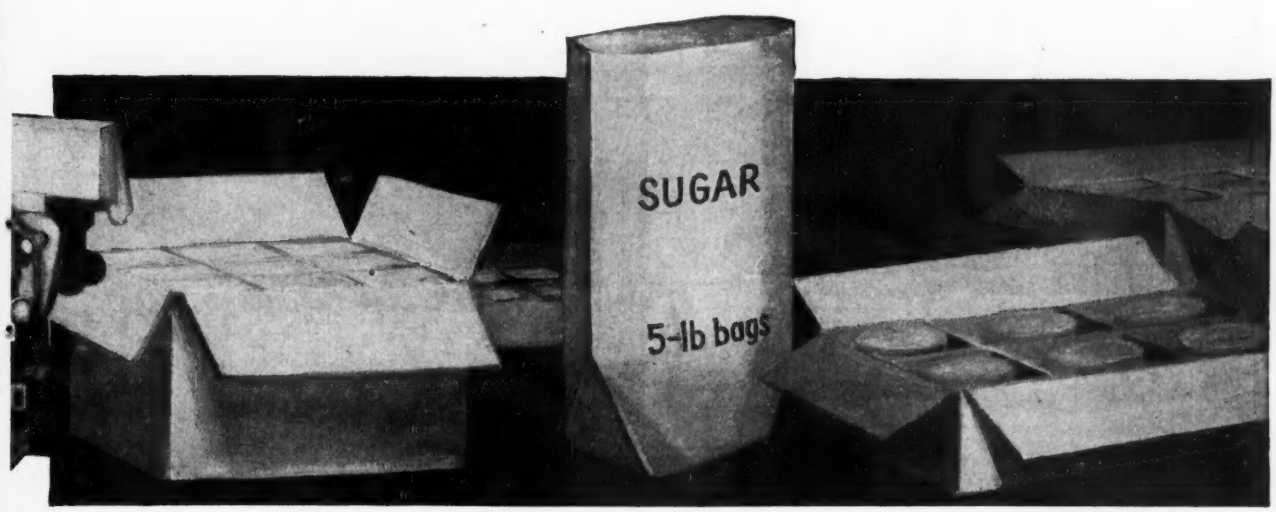

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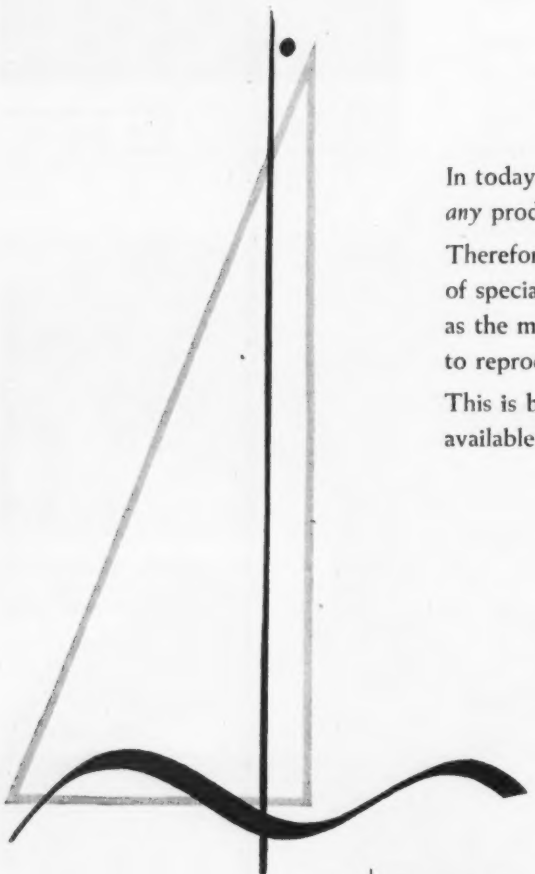
DAIRY SPECIAL

Design



In today's self-service food markets, the best salesman for *any* product is the *right* label design.

Therefore, Canco has at your disposal a large staff of specialists in creating good design—as well as the most modern facilities for metal lithography to reproduce any design with perfect accuracy.

This is but one of the many creative services available to Canco customers everywhere.

CANCO

American Can Company

New York, Chicago, San Francisco; Hamilton, Canada.

Antimycotic Wrapper

—*Continued from page 94*

tected in the tissues of the test animals.

This indicates clearly that the animal can dispose of ingested dimethyl dichlorosuccinate by normal means. Hence, with this material there is no question of accumulation in vital tissues and organs. This data is consistent with the long term feeding experiments, in that it shows the manner of elimination of ingested antimycotic.

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End (Resume reading on page 97)

Bulk Handling Milk

—*Continued from page 100*

low temperature it is not necessary to cool it further before processing. This effects a definite saving in plant refrigeration.

When we switched to 100% bulk handling, we realized all of the above benefits.

How They Show Up

Listed below are details on savings won through elimination of the straight-away can washer:

A. On fuel consumption alone, we feel that a 15-20% reduction has been made because of the high steam requirement of the washer.

B. Can washer and conveyor required a total of 10 hp. in motors for 3 hr. daily. But now a 1½-hp. pump motor is operated only about 1 hr. daily to transfer the milk from tank-truck to plant storage tanks.

C. Labor savings figure out this way—

Old Way	
Can dumping—2 men, 3 hr.	6 hr.
Cleanup—1 man, 1½ hr.	1½ hr.
Total	7½ hr.
Today	
Washing 2 tanks (45 min. each)	1½ hr.
Daily Saving	6 hr.

And this saving should increase materially with greater receipts by bulk tank.

D. Maintenance problems associated with the straight-away can washer and its incoming and out-going conveyors have been eliminated. These conveyors took the heaviest wear and were subject to more replacement and maintenance than any others in the plant.

Refrigeration requirements are definitely lower. This saving is approximately that needed to cool 3,000 gal. of milk from 65 to 40 deg. On the basis of power at 3c. per kw., the 75 ton-hours saved daily represent approximately $4.50.

Space formerly taken up by the receiving room has now been incorporated into the plant proper, enabling a rearrangement of equipment, and including installation of an additional raw-milk holding tank, a larger paper bottle machine, and a short-time pasteurizer.

Our Carrigan plant is located in a Niagara Falls residential section, where it faced a continual problem due to the noise associated with handling some 300 full and empty cans daily. Also, the unsightly looking loading deck, can conveyors, and farmers' delivery trucks, played their parts.

Now, one large (3,000-gal.) attractive-appearing tanker handles the entire delivery. It pulls into the unloading room, discharges its load silently, is washed, and departs.

The tanker and enclosed unloading operation also aid in putting across the quality story of Carrigans' Dairylea milk.

End (Resume reading on page 102

Detecting Foreign Fats

—*Continued from page 110*

used or proposed for the detection of adulteration.

One of the oldest and most reliable of these tests is based on the melting point of the sterol acetates. All animal fats contain cholesterol, while plant fats contain one or more different sterols, called phytosterols. Cholesterol forms an acetate melting at

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Instrument size: 3 x 5⅞ x 2½ inches
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Weight with accessories: 3 lbs.

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239 deg. F., while the acetates of the phytosterols melt at 257-291 deg. F. Therefore, a mixture of cholesterol and phytosterol will melt above 239°.

To detect mixtures containing as little as 5% plant fat in butterfat, it is necessary to concentrate the phytosterol in the isolated sterol mixture by repeated crystallizations from alcohol. Since cholesterol acetate is more soluble in alcohol successive crops of crystals will show a rising melting point as the proportion of phystosterol acetate in the crystals becomes greater.

While the method has been used for many years, it suffers from several defects. It is restricted to the adulteration of animal fats with plant fats. It is not a quantitative method, since the sterol acetates from different plants have different melting points. And finally, it is an extremely lengthy and complicated method, not suitable for routine use. However, it has been used in many court cases, both here and abroad, to show adulteration.

A much more convenient method for routine use, also based on an unsaponifiable constituent, is the determination of vitamin E or tocopherol, a natural antioxidant. Animal fats have very little tocopherol, with butterfat showing a range of 0.002-0.005%. Most vegetable fats have appreciable quantities, ranging from about 0.030%-0.150%. Coconut oil is an exception, with only 0.003% tocopherol. Reliable methods of analysis have been published,[7,8] and the recently proposed method of Mahon and Chapman[8] is rapid and capable of detecting 10% of almost all vegetable fats in butterfat. Vegetable fats with high tocopherol content, such as hydrogenated soybean oil, can be detected at the 5% level.

Several other tests have been proposed, particularly as rapid "sorting-tests" for isolating abnormal samples that could then be examined more carefully. The fluorescence test has been proposed by Lawrence[9] for detection of foreign fats in frozen desserts. This test, based on differences in colors exhibited under ultraviolet light, was originally claimed to show a 5% adulteration of butterfat. However, Bryant and Biggs [10] have demonstrated that the greenish yellow fluorescence of butterfat is due to the presence of carotene and that small quantities of this substance, added to vegetable fats nullify the test.

They conclude that, while Lawrence's test could differentiate butterfat from vegetable fats, it was not reliable for detecting partial substitution. They also attempted to apply the Critical Dissolution Temperature test, used by Felman and Lepper[11] to distinguish between butter and oleomargarine, and found that it could not be used to detect substitution below the 50% level.

A radically different approach to the problem has been proposed by several investigators. They advocate addition of an easily detectable "tracer" substance to vegetable fats that might be used to adulterate dairy products. Such a substance must be fat-soluble, non-toxic, and never found in butterfat or dairy products.

Sesame oil has been used for many years in Europe and India, as a required addition to oleomargarine or shortenings, so that adulteration of butter could be readily detected by the sensitive test for sesame oil. Butylated hydroxyanisole (B.H.A.) has been suggested by Bryant and Biggs.[10]

Mahon and Chapman[8] suggest testing all suspected samples of butterfat, since it is now common practice to add antioxidants containing B.H.A. to lard, tallow, and shortenings with low tocopherol content. Satisfactory methods are available for detecting very small amounts of B.H.A., so that if present in the non-dairy fat in the usual 0.02% concentration, as little as 10% adulteration can be found through this tracer. Recently, the ethyl ester of tyrosine has been proposed as a marker for hydrogenated oils in butter in India.[12]

In spite of the considerable activity in this field, no single analytical test has been developed that will detect and determine quantitatively low-level adulteration with foreign fats.

However, use of added "tracers" offers a possible method of control.

Two such substances, butylated hydroxyanisole and tyrosine ethyl ester, have been suggested, and sensitive methods for their detection in small amounts have been published.

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End (Resume reading on page 112)

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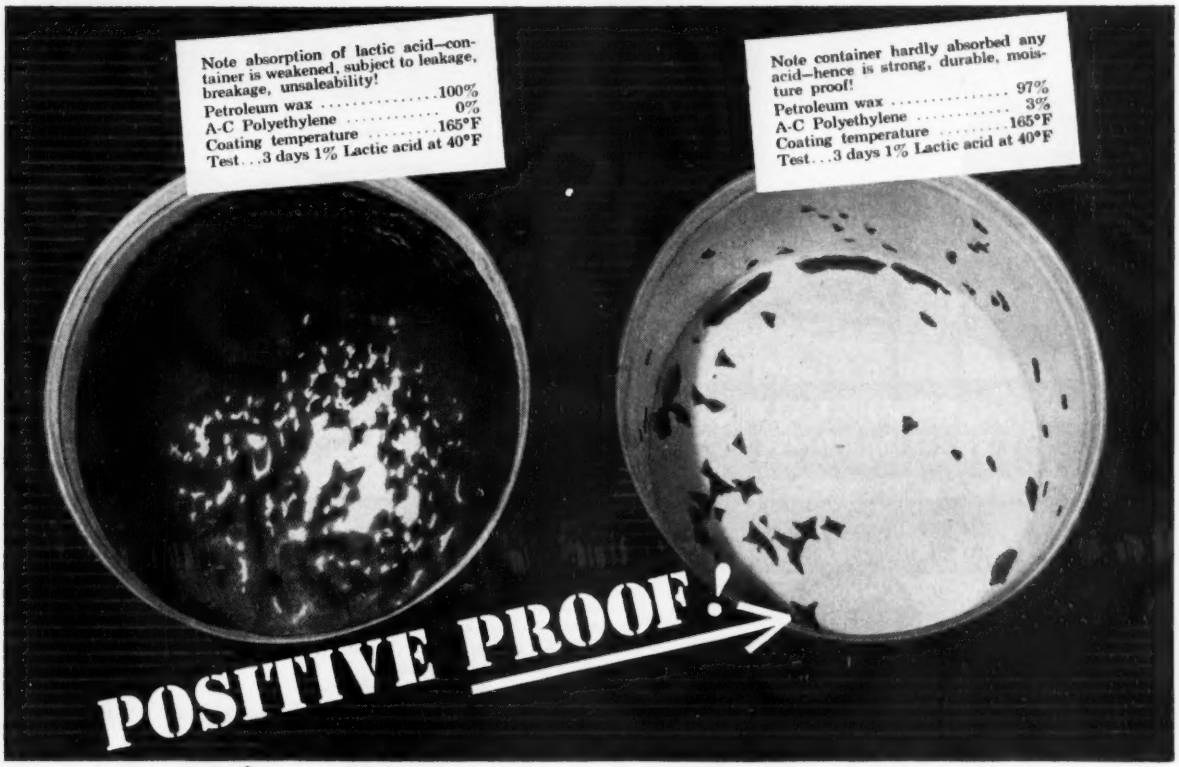
Note absorption of lactic acid—container is weakened, subject to leakage, breakage, unsaleability!
Petroleum wax 100%
A-C Polyethylene 0%
Coating temperature ..... 165°F
Test...3 days 1% Lactic acid at 40°F
Note container hardly absorbed any acid—hence is strong, durable, moisture proof!
Petroleum wax 97%
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POSITIVE PROOF!

A-C* Polyethylene EFFECTIVELY REDUCES LACTIC ACID ABSORPTION INCREASES SHELF LIFE

Both cottage cheese containers are identical except for the coating. The one on the left was treated with petroleum wax the usual way. The container on the right had 3% A-C POLYETHYLENE added to the petroleum wax. *Both were then tested with the standard methylene blue test at 40°F for 3 days.*

See how the lactic acid was absorbed into the fibers of the standard package. See how A-C POLYETHYLENE effectively reduced—almost to zero—the lactic acid absorption in the container at right!

WHAT IT DOES

Tough A-C POLYETHYLENE is a hard polymer that mixes easily with petroleum waxes. It helps strengthen cartons, reduces leakage, makes the coating more uniform and homogeneous. It improves the appearance of your package, brightens the printing, and lengthens shelf life with the increased resistance offered to damaging water vapor.

WHERE TO USE IT

Eye-appealing and loss-reducing, A-C POLYETHYLENE in wax blends is especially useful on milk, cream, cheese, ice-cream, and other similar containers.

Have your wax supplier make blends for you containing this easy-to-mix material!

For complete information on A-C POLYETHYLENE, call or write today! Use handy coupon.

*Trade-mark

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☐ Please send me technical information and samples of
A-C Polyethylene for use in_____

☐ Have a technical service representative call on me.

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Company_____

Address_____

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HEADQUARTERS FOR PRODUCTIVE PROCESSING EQUIPMENT SINCE 1928

COOKING KETTLES

Style A
Two-thirds Jacketed
5 to 500 gal.

Style B
Full Jacketed
10 to 300 gal.

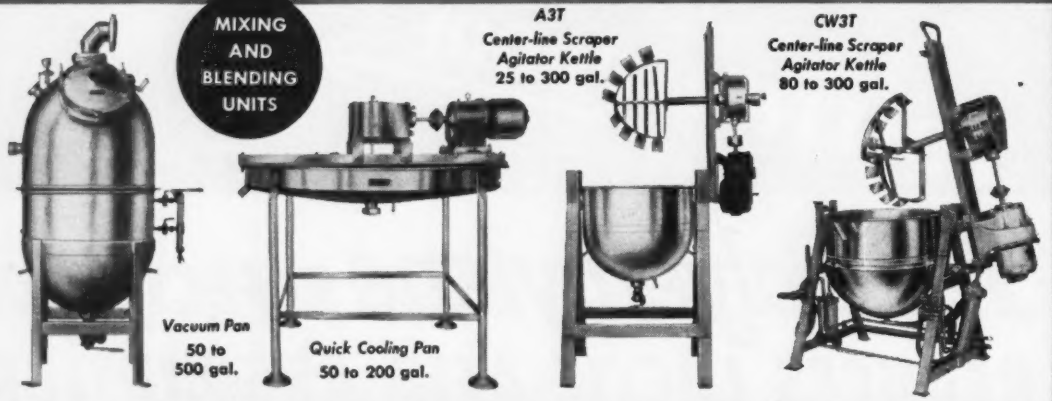
Style C
Two-thirds Jacketed
5 to 100 gal.

Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

Style CW
Two-thirds Jacketed
80 to 300 gal.

WIDE RANGE OF SIZES TO MEET YOUR NEEDS

MIXING AND BLENDING UNITS



Vacuum Pan
50 to 500 gal.

Quick Cooling Pan
50 to 200 gal.

A3T
Center-line Scraper Agitator Kettle
25 to 300 gal.

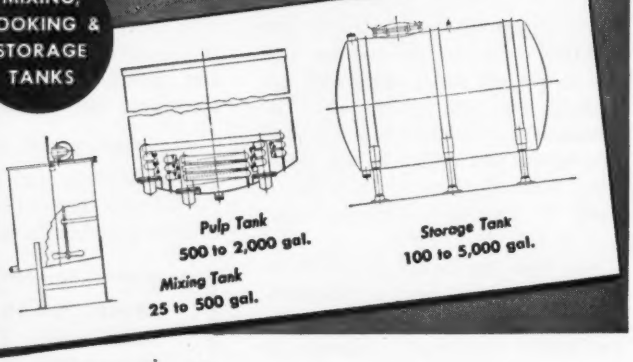
CW3T
Center-line Scraper Agitator Kettle
80 to 300 gal.

ALL UNITS BUILT FROM TIME-PROVED STAINLESS STEEL

LEE

CORROSION-RESISTANT
PROCESSING EQUIPMENT

MIXING, COOKING & STORAGE TANKS



Pulp Tank
500 to 2,000 gal.

Mixing Tank
25 to 500 gal.

Storage Tank
100 to 5,000 gal.

Precision-built to your specific requirements!

LEE corrosion-resistant equipment is individually-designed for a specific processing operation and precision-built to give long years of peak performance with a minimum of maintenance.

Descriptive technical bulletins are available. Write for them and find out how Lee can be of real help in solving *your* processing problems.

LEE METAL PRODUCTS CO., INC.
416 Pine Street
Philipsburg, Pa.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

Challenging Changes

—*Continued from page 73*

Adaptation of a small operation to HTST procedure for both milk and ice cream, is a matter of high interest. Such a process has been developed and is in commercial use.** In this, a standard plate heater has been modified with suitable controls. Approved by health officials, this installation appears to offer real possibilities for the small or medium-size operator.

The continuous churn is now an accepted part of butter making, and information now available indicates that it provides means of maintaining uniform body characteristics, controlling microbiological spoilage from mold and yeast, and maintaining excellent composition control.

Another continuous process in the development stage is that for cheese. Definite progress has been made in this direction and more is to be expected.

Instrumentation of a dairy plant is the engineer's dream, and it is in the process of becoming an actuality. Fulfillment of the automation idea would mean that all processes would be synchronized, making "button control" possible so that the entire operation may be handled on the basis of a continuous flow system. In the plant are many jobs that might be instrumentized, thus eliminating, to a maximum, the human element. The trend—a rapid one—is in this direction.

Attracting Good Trainees

Although we often speak of "labor costs," perhaps it would be well to speak of "labor investment," because each employee should be worth more to the company than he is receiving. He should constitute a profit item, and should yield continuing dividends to the company. Obviously, the better the employee the more profitable the investment.

Dairy plant management has the responsibility of assuring itself an unceasing supply of trained men and, also, maintaining a program that will lead to continuous education of employees.

Supply of college trained men for the dairy field has been low the past few years, and the number of available positions are far greater than the number of qualified men. This is of great concern, and efforts are needed now, as well as in the future, to correct the situation.

It is recognized that there are three basic things that must be done in this connection: (1) Get a greater supply of superior boys into dairy technology training, (2) give them the right training in the universities, and (3) permit them to use their training and their abilities to the utmost when they go into the plants after graduation.

Experience has shown that action at the local level is the best approach to interesting high school students in the vast dairy field. Programs are needed to acquaint high school principals and counselors with the career opportunities in dairying. Local dairy-financed dinner meetings have been effective in this connection.

Establishment of scholarships is helpful. But of more importance are heart-to-heart talks by dairy representatives with the superior students during their junior and senior years in the local high school. Also, opportunities for these young men to work in the dairies during the summers open the door for personal conferences that may be fruitful.

Another main responsibility, again resting with management, is establishment of suitable training programs that

** D. A. Selberling, Ohio State University, has installed this equipment in the Hopewell Dairy, Bellefontaine, Ohio, in cooperation with Frank Wish, plant manager.

IS YOUR FOOD PRODUCT LISTED HERE?

Aspics
Beer
Beverages
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Canned Fish and Meat
Canned Fruit
Canned Poultry
Cheese Spreads
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Frozen Fish
Frozen Fresh Fruit
Frozen Fruit Juices
Fruit Fillings (Pie)
Fruit Juices
Glazes
Ice Cream
Marshmallow Toppings
Meringues
Milk Puddings
Pet Foods
Pie Fillings
Pie Mix (Prepared)
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Sausages
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Sherbets
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Syrups
Water Gel Desserts
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..AND YOUR IMPROVEMENT PROBLEM HERE?

☐ Binding
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☐ Emulsifying
☐ Gelling
☐ Modifying
☐ Stabilizing
☐ Suspending
☐ Thickening
☐ Custardizing milk & products containing milk solids
☐ Improving mouth-feel and flavor
☐ Increasing efficiency of component ingredients
☐ Modifying ice crystal growth
☐ Physical & anti-oxidant protection
☐ Thermally-reversible gels

THEN YOU'LL FIND YOUR ANSWER HERE!

*SeaKem is the trademark for the standardized, water-soluble, sea plant extractives manufactured by the Seaplant Chemical Corporation. Refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem "Colloids Out of the Sea" are light amber to colorless, free-flowing flaky powders. Available in a variety of types suitable for use in an unusually wide range of food applications (see lists above), SeaKem Products have won acceptance on the basis of proven advantages with leading manufacturers and processors.

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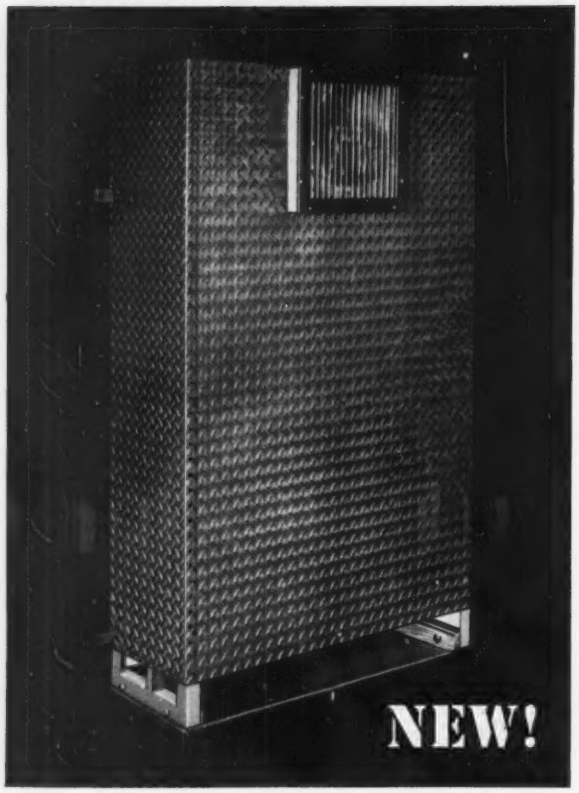

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THE Cel LINE

will result in a continuation of the education of the men in the plant. Establishment of a merit program that will permit selected employees to attend conferences, short courses, etc., at the state universities justifies consideration. Good plant morale depends upon management policy of making it possible for employees to improve themselves and to continue to learn. "Continuing education" is a vital need for all.

Basic in the whole personnel program are good human relations for maintaining high morale and loyalty at all times.

Such relations do not *just happen* in a plant. Many dairy organizations have lost valuable men and/or have had disagreeable situations arise because of lack of vision and failing to provide "those little things" that give the employee peace of mind and the sense of "belonging."

One real challenge is to appreciate more fully the value of technically trained men possessing leadership qualities. There still exists in many quarters a belief that the technical man is limited to the laboratory, to plant production, or to procurement. Thus, he is passed by when promotions are made to the management or executive levels.

But this concept now is being rapidly dispelled. A healthy sign is that numerous recent promotions have seen plant production men appointed to executive positions.

▶ **A good, technically trained plant production supervisor, who has demonstrated leadership quality and organization ability, and who has had direct contact with dairy relations, is admirably fitted to advance into the higher levels of administration. His technical training should be helpful to him in his executive duties.**

▶ **Failure of top management to explore the possibilities of moving key technical men into executive positions and of training them for such positions is inexcusable.**

Whether it be the job of high school recruitment, training college men, or use of continuing education programs, an extremely close dairy field-university relationship is needed. The university should supply the educational programs and the dairies should supply the men.

Also, close relationship is needed between these groups in order to evaluate existing curricula of the university with an eye to making such changes as are necessary to assure that the education program will meet requirements.

What About Research?

There is nothing mysterious about research, since it is basically a down-to-earth subject meaning dollars and cents to all persons in dairy field.

Most appropriate is Charles F. Kettering's terse definition, which describes research as "simply finding out what you are going to do when you cannot keep on doing what you are doing now."

The present status of dairying and its hope for the future depends upon research. The challenge is to recognize the value of such work and be willing to sacrifice in support of it.

Research is to be credited for many present practices, such as homogenization, flash pasteurization, newer cleaning compounds, better ice cream ingredients, and modern dairy equipment.

In the future it must be more basic than it has been in the past. Certainly, the research to come will require more highly trained personnel and more specialized laboratory facilities. We speak now of "cold pasteurization" by using radioactive materials, of bacterial destruction by supersonic waves—of many physical-chemical laboratory methods not even thought possible a few years ago.

Research needs are all about us. New dairy products await discovery. New marketing research is desired in regard to package type, size, and design. Market studies

TRENTWELD
tubing gives...

*corrosion resistance

*long service life

*ease of cleaning

*product protection

in Lo-Temp Evaporator

This Mojonnier Lo-Temp Evaporator is designed to remove water from heat-sensitive liquid foods, pharmaceuticals and chemicals, at temperatures as low as 40F. Heart of the evaporator is made of nests of TRENTWELD stainless steel tubing.

TRENTWELD tubing is an ideal choice for this application. For TRENTWELD stainless tubing resists the corrosive attack of both the product itself, and the ammonia refrigerant pumped inside the tubing. And TRENTWELD stainless is inert . . . protects the product from contamination. But that's not all—TRENTWELD comes-clean with an absolute minimum of effort.

So when you have a tubing application check first with TRENT. You'll find the largest assortment of sizes and finishes in the industry . . . standard sizes from ⅛" to 40" O.D. – larger sizes on special order. And remember, TRENTWELD stainless and high alloy tubing are products of *tube mill specialists*. You can't buy better than TRENTWELD.

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STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

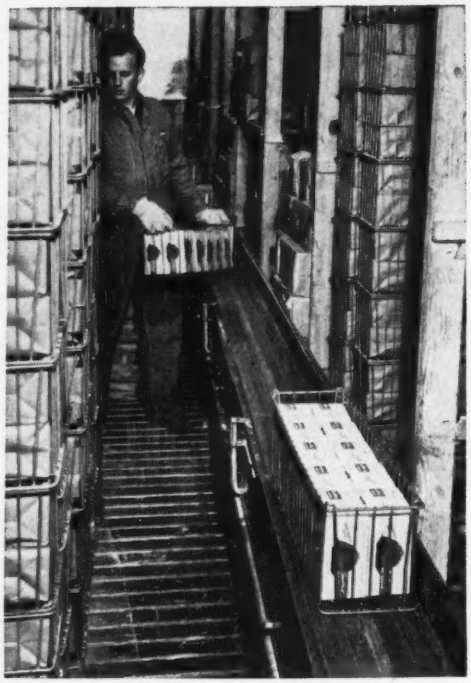
Use coupon on page 233.

DAIRY SPECIAL

SPARKS **WHITE POLAR-TEX BELTING**

Serves the SEALTEST ICE CREAM CO., of Kalamazoo, Michigan, every day at

15 DEGREES BELOW ZERO



Eighty feet of 10-inch wide Sparks White Polar-Tex Belting has been in operation handling packages of ice cream in a room at 15 degrees *below zero* for over 15 months at the Sealtest Ice Cream Company at the time this photograph was taken. What does not show in the photograph is the complete flexibility of the belt. Even in this constant low temperature Polar-Tex has not become hard or brittle, thereby overcoming a source of trouble usually found in an operation of this character.

There are 47 types of Sparks Belting ready to be built to specifications for the solution of conveying, transmission and elevating problems.

For Your Convenience in Ordering —

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- HAULTAIN CHAMPION CO.
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- D. E. SHIPP BELTING CO.
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SPARKS BELTING

An inquiry will bring information concerning belting for all food handling, including Sani-Cleats . . . the most advanced step in food conveying in many years.

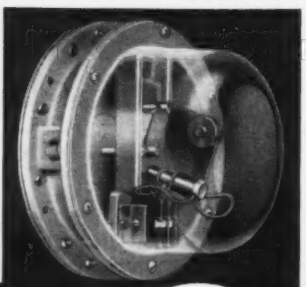
BIN-FLO AERATING UNIT

Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.

BIN-DICATOR BIN LEVEL INDICATOR

For All Bulk Materials

signals change in level; automatically starts and stops filling and emptying equipment.



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A Phillips No. 300 Float Valve is furnished as standard equipment on this Damrow "Cold-Zone" Refrigerated Wall Tank.

PHILLIPS
FLOAT CONTROLS

STANDARD with the FINEST in REFRIGERATION

With refrigeration manufacturers whose products are famed for quality and dependability, Phillips Controls are standard equipment. On new *or* older equipment, Phillips Controls bring greater efficiency, more dependable performance. Capacities range from 1 to 1,000 tons for Freon, from 1 to 2,000 tons for ammonia. Full information and engineering advice gladly given.

SERIES 300 PHILLIPS FLOAT CONTROLS

- **SERVICEABLE — No "pump-down" needed to inspect or renew cartridge.**
- **ADAPTABLE—For most types of flooded evaporators.**
- **COMPACT—Mounts directly on surge drum.**
- **IDEAL for storage tanks, air and water coolers, ice builders and other "packaged" units.**

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REPRESENTATIVES: The C & S Equipment Co.
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must be conducted to reveal the consumer's desires. Engineering research opportunities are almost unlimited. Some have already been indicated.

Many dairy operators feel that design and fabrication of new equipment have not kept pace with needs. It is interesting to note that foreign machines are being imported for ice cream novelty operations. In all, great economies in plant operation may be achieved by dairy engineering research.

Leaders in other industries appreciate the value of research. Roger Williams, of DuPont, declares, "We do research because we have to. If we let up, our competitors will trim us." John R. Hoover, president of B. F. Goodrich Chemical Co., has said, "Today's industrial manager knows from experience that creative research pays off many-fold in lower costs, improved quality, and new products." Clyde Williams, president of Battelle Memorial Institute, said recently, "Industry turns to the research laboratory to find new frontiers and resources. Through research and technology, we can find new products and opportunities for new industries."

The dairy branch of the food industry is comprised in large measure of small, independent companies, and it is not possible for each to finance its own research program. Therefore, basic research must arise in universities and colleges and in federal laboratories. Because of this fact, it behooves the dairymen to support such agencies in their research endeavors and to counsel with them so that a continuing supply of valuable research will be forthcoming. It is not enough that research be done to corrobate a practice but, rather, that research be of a pioneer nature to investigate heretofore unexplored areas.

From the industrial standpoint, research is not the end in itself, but is a means to an end. The "end" is application of laboratory's findings. Therefore, adequate communication is necessary between research centers and plants so that research findings may be properly interpreted and placed at the disposal of the plants within the shortest possible time.

Keen, alert leadership is essential if these and other current trends are to be avaluated logically, and if the challenges are to be faced realistically.

The time for true statesmanship was never better, and close cooperation between dairy groups probably is more essential now than at any time in past history. The changes which are evident and the problems which these changes create demand cooperative effort.

End *(Resume reading on page 74)*

Automatic Dairy Process

—Continued from page 83

tinuous basis—and while it is still being processed. These measurements can then be used to re-balance operations to optimum quality, directly or indirectly.

A case in point is the Robichaux development for continuous standardization of dairy products (see FE, Sept. '51, p. 98).

Inventor Robichaux found that caustic added to cream in the vacuum chamber of a Vacreator produced almost instantaneous neutralization. A key element in his discovery was a conventional glass electrode pH measuring system that picked up indication of this "flash" reaction directly downstream of the Vaccrator.

In this case, the in-stream measuring technique for a value of cream quality—its acidity—became the prime mover for a new continuous process.

And by converting the pH recorder to control and adding a proportioning needle valve for reagent to the vacuum chamber, Robichaux was able to continuously neutralize to within 0.2 pH.

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REALLY PURE

REALLY DRY

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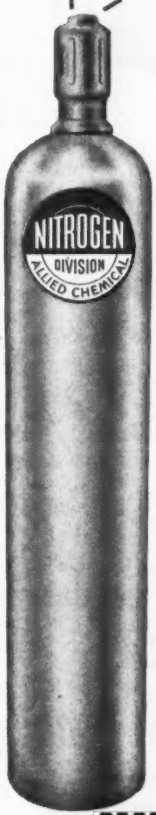
BARRETT® BRAND

Anhydrous Ammonia



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Lower operating costs

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—high speed delivery! Cylinder stocks maintained at all our coast-to-coast distributing stations. There is one near you ready to fill your needs promptly and regularly. 150-, 100- and 50-lb. cylinders. If you use *large* quantities, ask about our tank truck delivery service—*you'll save money.*

Outstanding purity —no free non-condensable gases to cut down efficiency, or other impurities to corrode equipment.

Exceptionally low moisture content
—doesn't freeze up expansion valves, corrode equipment or ice up in evaporators. If purity is important to you—why specify anything but the best—especially when the best costs not one penny more.

Valuable Help! Send Today!

☐ Please send your free Ammonia Leak Detector Kit. (Pocket size, this handy kit can be used over and over again.)

☐ Please have your specially trained Ammonia Technical Serviceman call, discuss the economical use, etc. of Anhydrous Ammonia. No obligation.

☐ Please send your valuable handbook "Guide to use of Barrett Cylinder Ammonia." (Shows most economical usage; contains chemical properties, handling, charts, etc.)

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Premium Quality
Dry Milk is HERE!

And you'll see and taste this delicious nonfat dry milk made from Grade A milk by Westerville Creamery Co. using the

Mojonnier Lo-Temp Process

. . . for economical and continuous production of DRY MILK of unequalled quality and solubility.

You'll also see the latest improvements in the complete line of Mojonnier equipment for the dairy industry.

- Bulk Coolers
- Bulk Tankers
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See it all at the Dairy Show, Oct. 25-30

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Naturally, dairy processors would like a direct payoff for continuous control of economically fundamental qualities, such as butterfat content and ice cream overrun. Hence, the search has been more widespread in this area, with promising results slowly glimmering in the past year or two.

Take butterfat. Many efforts have been made to speed up the famous Babcock test, which is accurate to within 0.1-0.2% error and is standard for commercial evaluation of fat content. However, an "in-stream" Babcock appears pretty much impossible due to its need for extraction.

Other, indirect approaches were taken. For example, dairy technologists have attempted for years to correlate viscosity with fat content, but results have been conflicting. Then in the past few years X-rays have been passed through milk with promising indication that this type of gaging may lead to fairly accurate fat measurement. And recently it has been suggested that the in-stream infrared spectrometer might apply, since this unit is now at work successfully measuring fat composition in an edible oil processing plant.

Fat Control Promising

However, some current work gives promise that control of fat by viscosity may prove to be a practical and simple means of in-stream control. This employs the recently perfected Brookfield temperature–compensated in-line viscosimeter as a continuous measuring device. The instrument actually indicates viscosity by electrically measuring the power required to stir a paddle in the product at constant speed.

In the current test installation we are advised that 40% cream on the discharge side of a separator is being measured to within 0.1% error by the viscosimeter–and no other method has been able to crack the 0.5% barrier consistently. Further, this measurement is very nicely tied into a feedback system that will control butterfat from the separator to within 0.1% of a desired value.

Thus, an electronic recorder-controller is set up to throttle a sanitary valve in the outlet line for cream. This is said to correct the fat content of the cream as required, since the ratio between cream and skim from the separator directly determines the fat content of the former. If this experimental system works as planned it should be a real eye-opener.

Overrun Control

Continuous overrun measurement–and control–has been another long-sought technique.

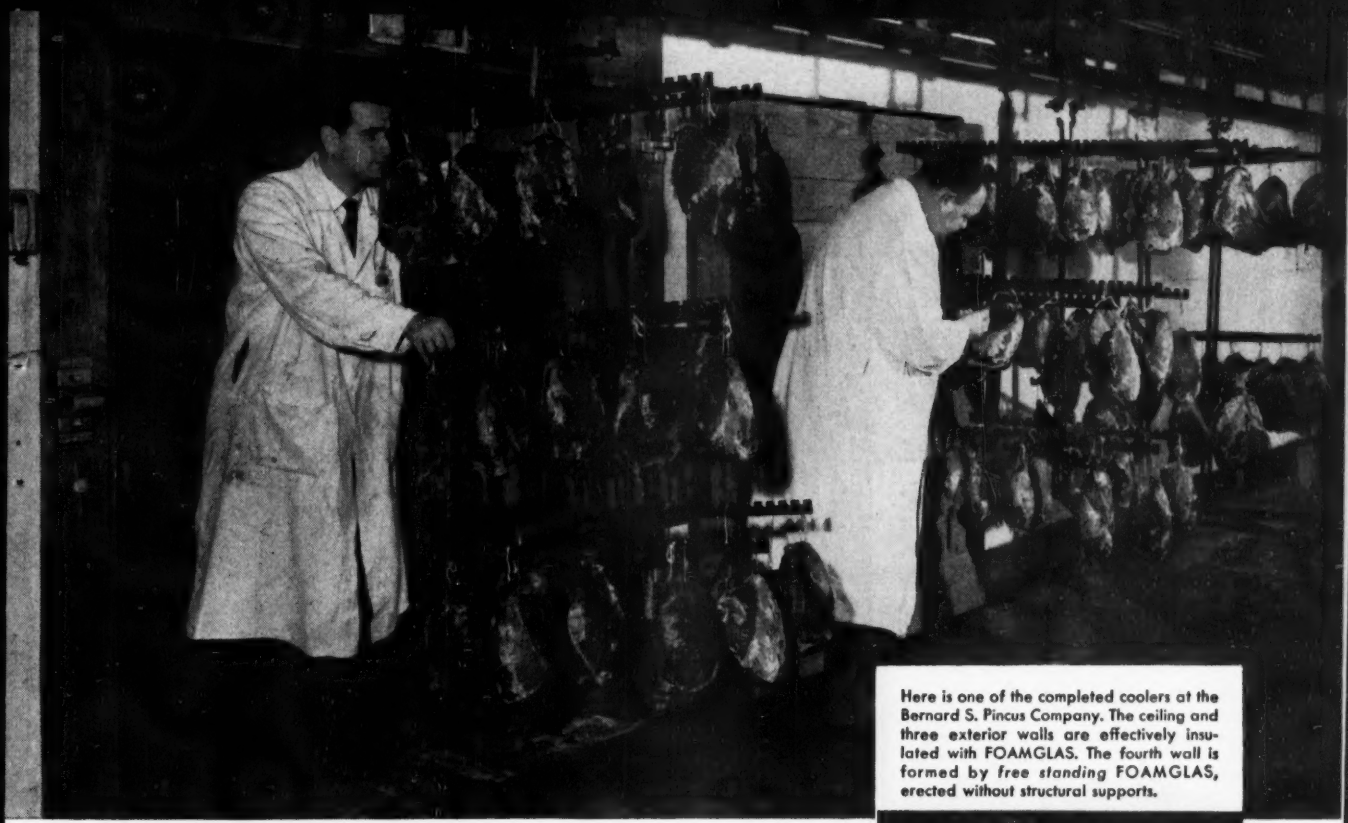
Because of the difficulties of direct measurement, inferential type measurements have been tried. Hence, sanitary electronic differential pressure gages measuring the ratio between incoming mix and outgoing product have been promising. Also, viscosity-type measurements of mix suggest some index of its overrun, provided all freezer variables are well under control.

Still a third approach has been a continuous density measuring unit, with temperature compensation, and reset by density of the incoming mix. In most of these experimental systems control was attempted through regulation of air into the mix.

Yet another plausible attempt at overrun control is U.S. Patent No. 2,508,152, issued on May 16, 1950, involving ultrasonic waves as a means of measurement. The writer has not yet heard of any field application of this system.

These interesting approaches to overrun control are indicative of the devious paths which may have to be taken to solve the many in-stream quality measurements posed in dairies.

End (*Resume reading on page 84*)



Here is one of the completed coolers at the Bernard S. Pincus Company. The ceiling and three exterior walls are effectively insulated with FOAMGLAS. The fourth wall is formed by *free standing* FOAMGLAS, erected without structural supports.

"Because FOAMGLAS stays dry, it's perfect insulation for our new coolers"

states Abe Cooper, President, Bernard S. Pincus Company, Philadelphia

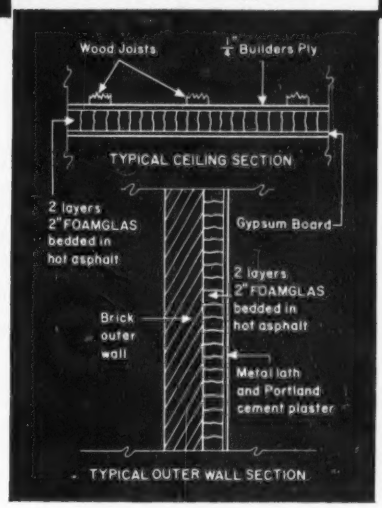
"We found FOAMGLAS, as recommended by David Rice & Co., Consulting Engineers, perfect for insulating our new ham and dried beef coolers and enlarged bacon slicing room," reports Abe Cooper, Bernard S. Pincus Company. "FOAMGLAS was used because it enabled us to obtain efficient refrigeration and exact humidity control. Both are essential to the conditioning we use to maintain our meat quality.

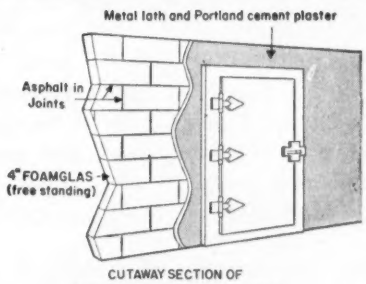
"Since the sealed glass cells of FOAMGLAS can't absorb or transmit moisture, its insulating efficiency is consistent and long-lasting. This moisture-proof quality also prevents the moisture migration which could impair our humidity control. FOAMGLAS makes it possible for us to hold relative humidity at any selected point . . . and it helps us get top efficiency from our refrigerating system."

Mr. Cooper concludes, "In addition our construction costs were cut by using FOAMGLAS. Its extra strength and rigidity enabled the use of free standing FOAMGLAS—without structural supports—for two interior walls."

The Pincus Company got outstanding multiple benefits from FOAMGLAS. How about you? Whatever your refrigerating-insulating problems may be, why not investigate this unique, cellular glass insulation today?

Send for a sample and our booklet describing the use of FOAMGLAS to insulate cold storage space.


Wood Joists
¼" Builders Ply
TYPICAL CEILING SECTION
2 layers 2" FOAMGLAS bedded in hot asphalt
Gypsum Board
2 layers 2" FOAMGLAS bedded in hot asphalt
Brick outer wall
Metal lath and Portland cement plaster
TYPICAL OUTER WALL SECTION



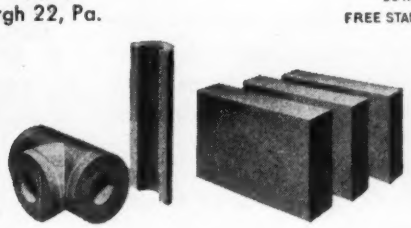
CUTAWAY SECTION OF FREE STANDING FOAMGLAS WALL

PITTSBURGH CORNING CORPORATION

Dept. O-104 • One Gateway Center • Pittsburgh 22, Pa.

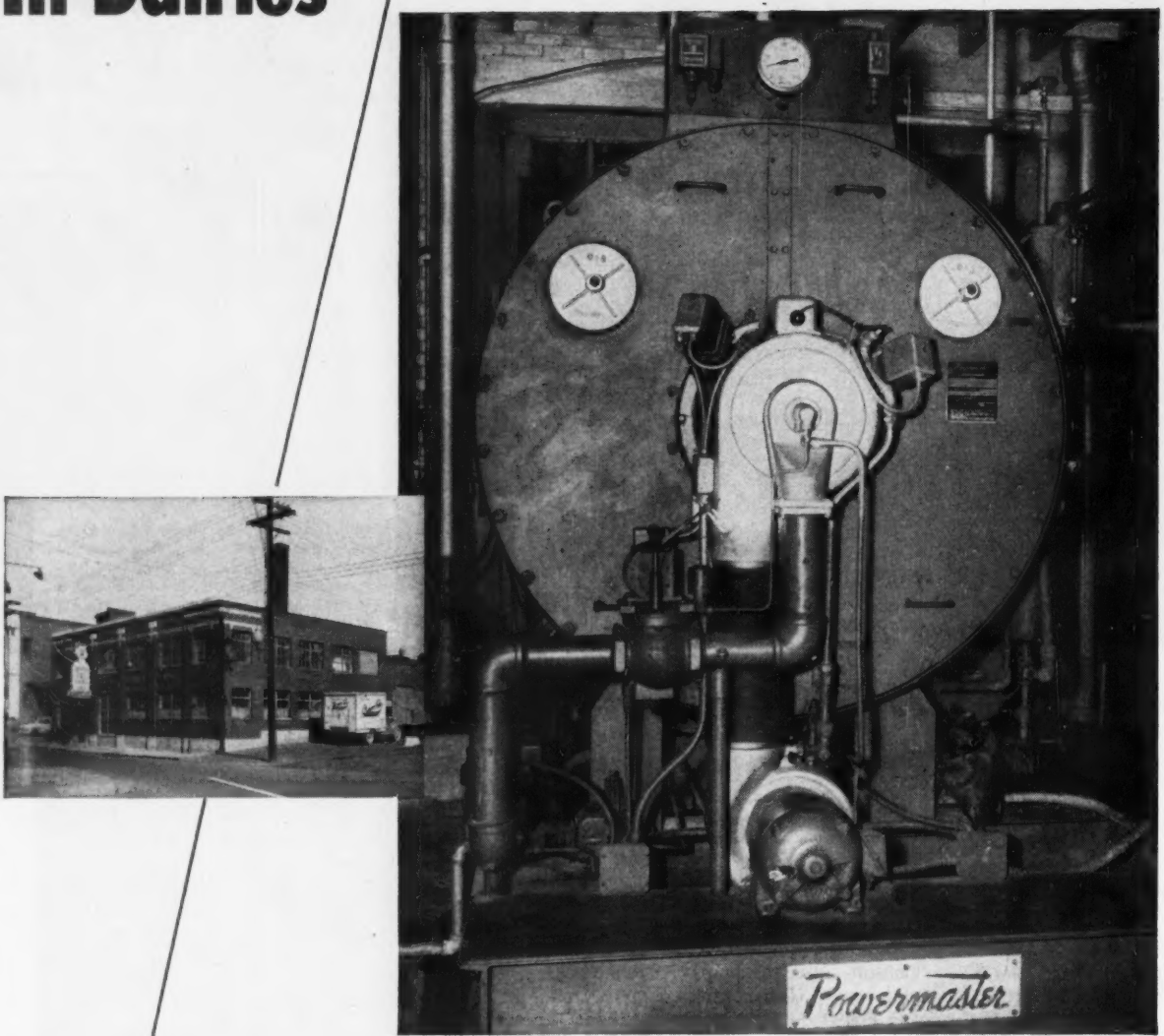
FOAMGLAS®

the cellular, stay-dry insulation



Pittsburgh Corning also makes PC Glass Blocks

In Dairies

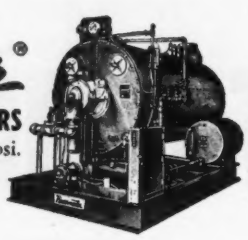


Powermasters® Cut Steam Costs

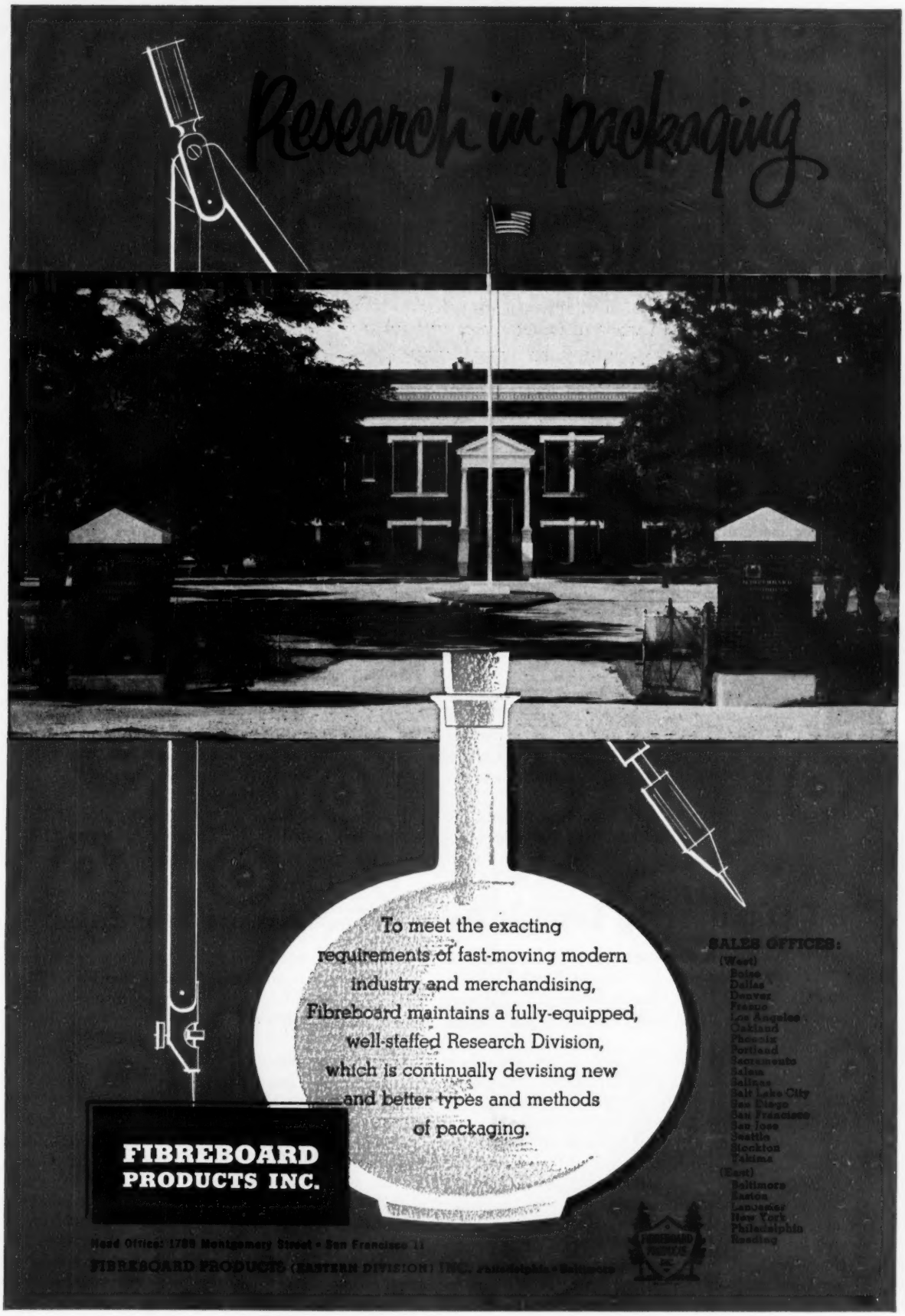
For example: Boiler operating costs show a substantial saving since this 100 HP gas-fired *Powermaster* Packaged Automatic Boiler replaced a hand-fired, coal-burning boiler in 1950 at the Queen City Cooperative Dairy, Cumberland, Md. Generating steam 10 hours a day, seven days a week, the *Powermaster* has required no maintenance to date.

Have you checked your steam costs lately? Dairies, bakeries, bottlers, canners, packing houses, and other food processing plants are saving with these *Powermaster* advantages: Space-saving compactness, fast steaming, hospital-clean operation, high fuel economy, maintenance-saving accessibility, fully automatic operating and safety controls and smokeless combustion. Might pay you to find out why satisfied users all over the U.S.A. are saying "Steam costs go down where *Powermasters* go in." Send for the latest descriptive bulletin on *Powermasters.*

O·S *Powermaster*®
PACKAGED AUTOMATIC BOILERS
In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • **Morgantown Road, Reading, Penna.**



For more information, use coupon on page 233.

In Behalf of Progress . . .

You Can Benefit by Competing for Best-Process Award

What greater honor could come to your company than to receive international acclaim for having developed, or adopted, the most important new food process?

In this day of fast-paced changes in food manufacturing, such an honor automatically attaches to itself an unparalleled recognition of technical competence.

In this time of great need for cost-cutting and quality improving methods, such an honor throws the spotlight on management's leadership in the technical phase of the business.

These factors lend particular importance to the forthcoming 1955 Food Engineering Award. The winner of this award will be selected by a Jury of leading food technologists. And its presentation will be made at the next annual meeting of the Institute of Food Technologists.

So the recognition proclaimed by the large bronze plaque Award far transcends intrinsic values.

Nor is such credit for achievement merely of academic value. It has some very important practical aspects.

Credit for outstanding achievement is food for the souls of those who strive for progress. When creative genius is rewarded, it not only is pleased with its environment, but is inspired to further accomplishment. And the pay-dirt results can be great indeed.

But that's not all. When a company is recognized as a leader, the morale of everyone working for it gets an uplift. There is no one so indifferent that he is not proud to be part of an organization that is out in front.

Such a reputation, too, attracts high-caliber personnel—the kind a company needs to maintain leadership.

As a matter of fact, the very act of entering the competition for such an award is inspiring to a company and its people. That alone tells them that they have done their jobs well, that the company is proud of their achievements.

And there is a considerable element of incentive for good scientific work in the satisfaction that comes to the technologist or engineer from having the results of his work brought to the attention of his industry. What's more, the quality of his work is likely to be higher if results are to be presented to others for an evaluation.

Finally, the cross-fertilization of ideas, and the technical rivalry, resulting from the revelation of good technical work produce more rapid advances than otherwise would take place in an industry. And who can deny that progress in an industry benefits the worthwhile companies in that industry?

Since you win in so many ways by going after recognition in your industry, don't miss the opportunity to compete for the 1955 Food Engineering Award.

You'll find directions for entering, together with information about the Award, on page 244.

———

P.S.—Each of the other awards presented at the annual IFT meeting also is of far-reaching significance for many of the reasons cited in this editorial.

IFT Engineering Session Pays Off—Another Scheduled

Did you attend the engineering sessions of the annual meeting of the Institute of Food Technologists in Los Angeles this summer? Or did you read the highlights of these sessions in the August issue of FE?

If you did either, you'll recognize the importance of the information and ideas presented. They were important because engineering is an essential "ingredient" in a well-run food business today.

Raymond Stevens, vice-president of Arthur D. Little, put it succinctly in his talk at the session:

"Engineering plays a dual role in industry—it shares with the research scientists their responsibility for creative work, for improvement of quality, and for the maintenance of quality. At the same time, engineering shares with financial and accounting personnel the quantitative aspects of management . . ."

In fact, the engineering part of the program in Los Angeles was so beneficial that the 1955 IFT Program Committee has scheduled a session on engineering subjects at the annual meeting next summer.

Plans for this meeting were outlined and a call for papers was made, in the September issue of *Food Technology*. Anyone desiring to present a paper must send information about it, not later than November 15, to F. E. Deatherage, Dept. of Agricultural Biochemistry, The Ohio State University, Columbus 10, Ohio.

If you have information for a paper about advances in a unit operation of food manufacturing, you'd better tell Mr. Deatherage about it soon.

A bang-up 1955 IFT program—including a meaty engineering session—will be another contribution to progress in the industry.

If your Raspberry Flavor doesn't last,

she'll buy someone else's fast.

NORDA Flavors don't fade out,

So... always come to NORDA

Is your gelatin guilty? When a woman uses your gelatin mix, does the flavor grow pale as she prepares it, so there's no taste when the gelatin's eaten? Use Norda Flavors. The flavor stays true. Prove it by sending your business letterhead for *free samples* to try and test.

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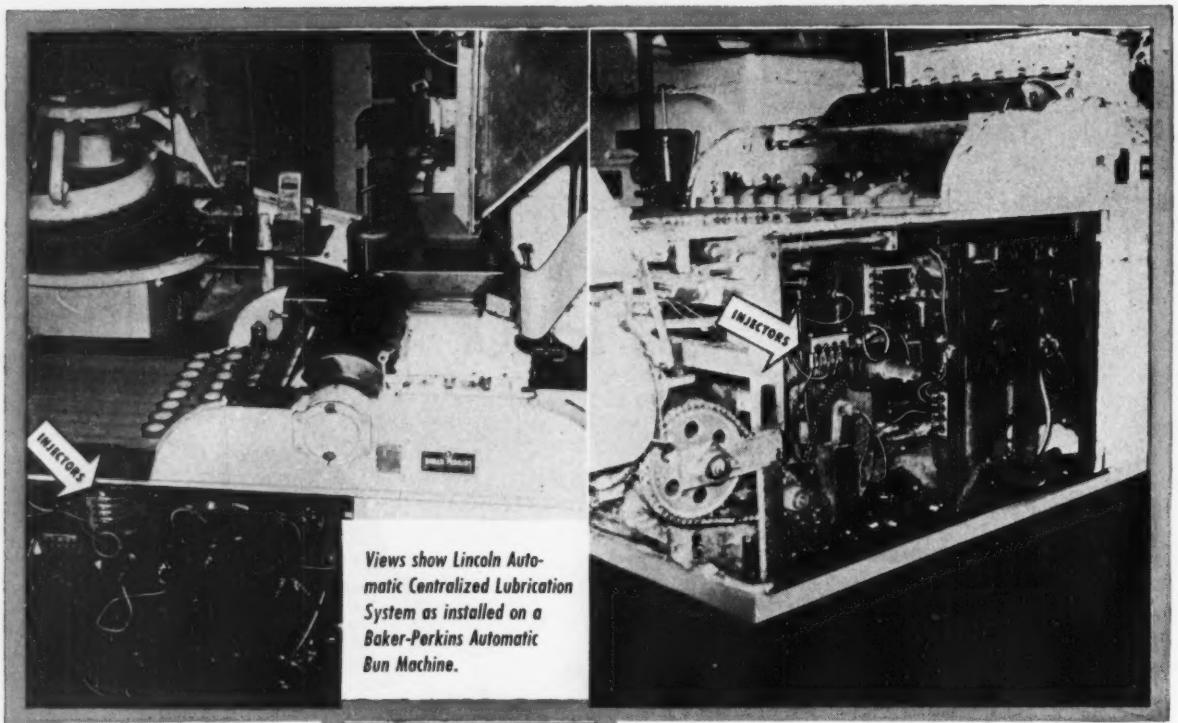

Views show Lincoln Automatic Centralized Lubrication System as installed on a Baker-Perkins Automatic Bun Machine.

Mrs. Karl's Bakeries,

Milwaukee,

Reports

"It was necessary to shut down our automatic Bun machine three times a day in order to lubricate by hand methods the 69 bearing points. Workers were thus tied up for 1½ hours every day while production stopped. In addition, there was always the danger of contaminating food products because of the application of an excessive amount of grease.

"As a direct result of installing the Lincoln CentrOmatic Lubrication System, down-time for lubrication has been eliminated, and production time increased 1½ hours per day. Lubricant consumption has been reduced by 50%. Contamination of food products by excess grease has been entirely eliminated, and there have been no bearing failures due to improper lubrication since the System was installed."

Mrs. Karl's Bakeries
E. S. Duffy, General Manager

"As a Direct Result of Installing **Lincoln** *Centromatic Lubrication System—*

Down-time for Lubrication Eliminated

Production Time Increased 1½ Hours Per Day

Lubricant Consumption Reduced 50%

Contamination of Food by Excess Grease Entirely Eliminated

No Bearing Failures Due to Improper Lubrication"

Distributed Nationally Through Leading Industrial Distributors —in All Principal Cities

Lincoln's lubrication equipment specialists will be glad to tell you how Automatic Centralized Lubrication can assure you comparable results as were obtained by Mrs. Karl's Bakeries. They will be glad to study your problem and recommend the right type of Lincoln Centralized System for your food processing equipment.

Write for your copy of catalog 80, giving complete information on Lincoln Centralized Lubricant Application Systems.

• • • PIONEER BUILDERS

LINCOLN ST. LOUIS

LUBRICATING EQUIPMENT • • •

5781 NATURAL BRIDGE AVE., ST. LOUIS 20, MO.

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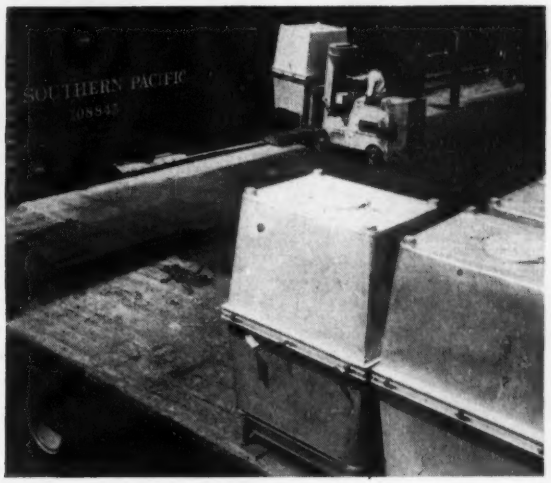
NEW EQUIPMENT & SUPPLIES



"Nesting" Bulk-Shippers Are Light, Sanitary

Cost-saving advantages of bulk materials handling of granulars, powders, and pastes are gained—even by the small processor—with use of these lightweight, sanitary shipping containers. Called Nest-A-Bin, the bulk container is distinguished by its "nesting", durability and convenience of direct bottom dispensing.

Empty bins may be disassembled and placed one within the other like paper cups, thereby occupying an average of only 10% of the usual floor space required in plants or while being transported. A reduction of storage and freight costs is the result. Bins are constructed of a high-strength, corrosion-resistant aluminum alloy to withstand severe handling conditions.

Bin is being produced initially in three standard sizes, holding 63, 70 or 77 cu. ft. of dry commodities. It is made up of three nestable components: two tapered rectangular halves to contain material being shipped, and a four-legged base. Bin, measuring 42 by 53 in. at its center, varies in overall height from 5 ft. 10 in. to 6 ft. 10 in. and weighs from 175 to 195 lb., depending upon capacity.

A standard 32-ft. trailer will hold 14 loaded bins and up to 170 nested empty bins, while 22 loaded bins and up to 308 disassembled containers may be loaded in a standard freight car.

Bin is easily handled with a standard fork lift, pallet truck or overhead crane. When empty, bins may be assembled and nested by hand. Sections are clamped together by fasteners designed for maximum speed of operation, and safety.

Bins fill from top and empty from bottom through circular doors and are easily adaptable to standard filling and discharging equipment. Special fittings prevent spilling, "blow-back" or other loss. Bins are hermetically sealed at all openings by non-toxic, plastic gaskets to protect products against contamination, deterioration or damage.—*Kaiser Nest-A-Bin Div., Willys Motors, Inc., 800 Doolittle Drive, San Leandro, Calif.*

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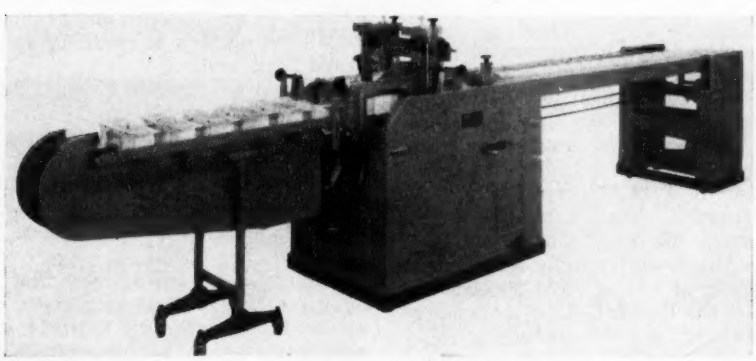

Improvements Double Carton Sealer's Output

Many new production features are reported for this new Model 3901B, carton glue sealing machine. It is reported they provide as much as 100% rise in output over previous models.

Most advanced feature consists of vertical glue wheels which apply glue in any desired pattern to any or all flaps of carton. Uniform application assures a neater, cleaner seal. In addition, maintenance and clean-up are speeded by ease of removal of rollers and scrapers.

Semi-automatic, it requires only a simple adjustment to handle cartons in a wide range of different sizes and shapes. Changeover may be made by any unskilled operator in less than 3 min.

The machine will handle gluing of economical "meeting outer flaps" type of carton, as well as full overlapping and partial overlapping outer flaps, in all cases assuring a positive inner seal. Variable speed controls adjust machine to production requirements.

Unit is self-contained, mounted on casters for easy portability.—*Container Equipment Corp., 78 Locust Ave., Bloomfield 2, N. J.*

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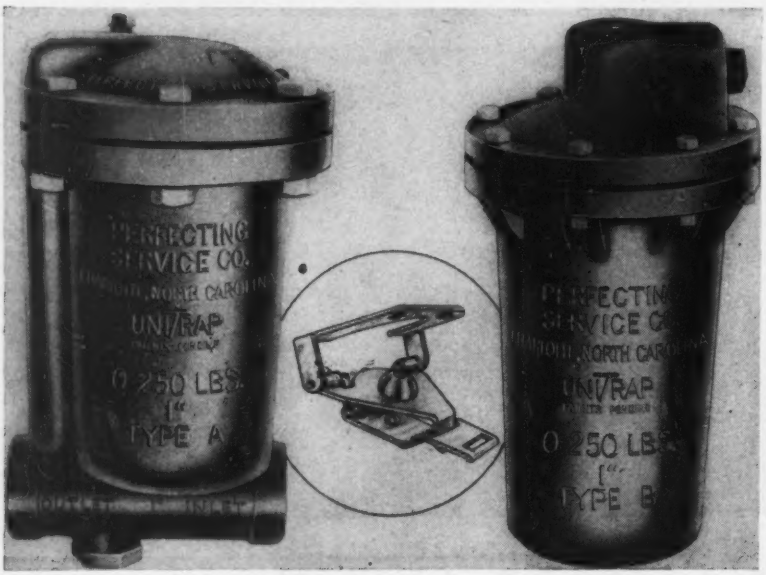

Bucket Type Steam Trap Operates Automatically

Minimum wear and wire drawing of valves and seats is claimed with this new type bucket steam trap. Called Uni-Trap, it employs a balanced valve principle, and automatically operates through pressure ranges up to 250 psi. without adjustments, changing orifices, or valves. Only pipe size is needed to specify requirements. Unit is suited to process industries where load and pressure range vary. Greater capacities of condensate handled through extra large orifices.

Dual-Valve (as pictured) makes possible numerous applications. When trap is filled with condensate, bucket opens a small pilot valve, equalizing pressure on both sides of large main valve; pressure immediately becoming balanced allows bucket to continue its descent and open large capacity valve, thereby discharging condensate rapidly.

New type trap is made in two styles —the standard, bottom inlet and top outlet type, and the in-line unit, that may be repaired without removing from steam line.

All internal parts are made of stainless steel, valves and valve seats are 500 Brinnel hardness. Available in pipe sizes ½ through 2 in.—*Perfecting Service Co., 332 Atando Ave., Charlotte, N. C.*

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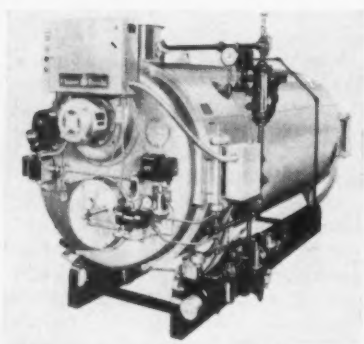

Packaged Boilers Are Quiet in Operation

Completely self-contained, package type boiler units are now offered in 50, 60, 70 and 80 boiler hp. capacity ratings. They are designed for use in industrial installations requiring steam or hot water boilers for processing or heating.

Among major features providing improved boiler performance claimed for these "CB" units are:—Silent operation, with notably low decible ratings; full modulating burner.

Models are available to handle all grades of fuel oil, light distillate No. 2 to 6 or Bunker C. Units are equipped with efficient oil pre-heating equipment attached to boiler base frame and a new oil pump using a gearhead motor which eliminates pump noise. Fireye electric combustion safety control assures greater safety in operation as standard equipment.

Boiler has maximum accessibility for operation and maintenance with easy-to-open hinged doors on front and rear. New models burn gas or oil and can be converted from one fuel to another in less than a minute.

Boiler is compactly constructed and complete in one integrated unit. All operating and safety controls are accessible with burner components mounted on front head.

Greater heat absorption is gained in four-pass construction and minimum efficiencies of 80% are guaranteed by manufacturer when firing with oil.—*Cleaver-Brooks Co., 326 East Keefe Ave., Milwaukee 12.*

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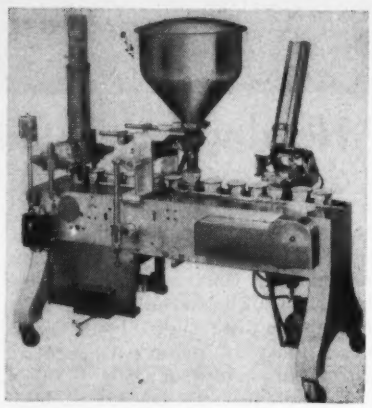

Cottage Cheese Filler Is Fast, Flexible

This new straight line cottage cheese and sour cream filler can be converted readily into a twin line, double-speed machine.

Designated as the DSI unit, it dispenses, fills, caps and codes up to 30 cartons per min. as a straight line machine. When converted into a twin line filler it operates at speeds up to 60 and 70 per min.

Operation of machine is entirely automatic and requires services of only one attendant. It handles any type container in sizes up to 16 oz. Extra large filling outlet and gentle action are an aid to bottom up filling with no breakage of large curd cottage cheese.

These packages are reported neat and clean, and product weights are accurate. As a further aid to trouble-free operation, unit is equipped with the new capper that eliminates over 90% of all work stoppages formerly caused by variations in lid diameter, thickness or warpage.—*Triangle Package Machinery Co., 6633-55 W. Diversey Ave., Chicago.*

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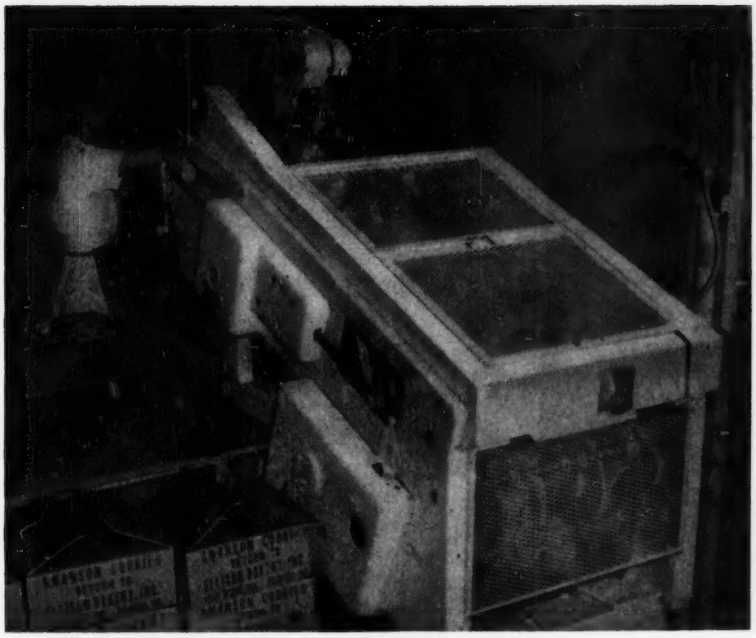

Speedy Size Adjustment Marks New Wrapper

This new, high-speed wrapping machine can be adjusted for a given size of cookie package in 2 min.

Known as the Universal 6, it accommodates packages from 4 to 16 in. long, 2 to 9½ in. wide and ⅜ to 5¼ in. high. Any type of heat-sealing cellophane can be used, including Olin's OX-500 and DuPont's K-202 films.

Two hand-wheel adjustments set machine for length of package. Its self-measuring wrapping material feed takes care of variations in height and width. Two or more cookie packages having same package length and paper roll widths, but having different package thicknesses and widths, can be run intermittently without any adjustments whatever.

Machine is equipped with an adjustable card feed that handles both U-cards and flat cards. A labeler can also be supplied which imprints thermoplastic labels, cuts them from a roll and applies them to tops of packages. Logotypes are furnished for imprinting prices, names of items, weights, codes.

Machine has an adjustable speed range of 15 to 40 packages per min. Standard infeed allows 5 ft. of loading area. Additional conveying extensions to 30 and 77 in. are available.—*Package Machinery Co., Springfield, Mass.*

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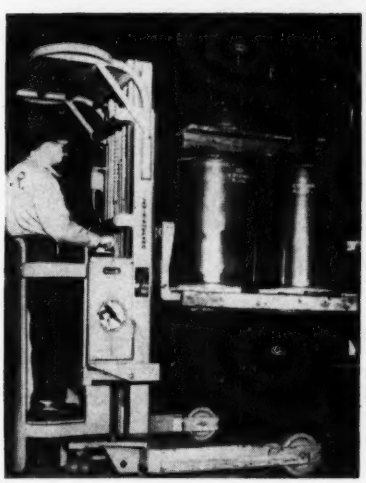

Ups Operator Protection On New Lift Truck

Increased safety and protection for the operator are reported for this new Model M Space Master lift truck.

Operator enters truck cab from side. A wrap-around compartment of reinforced steel shields operator against collision, eliminating a major hazard of narrow aisle truck operation.

New electric foot brake in compartment allows operator to control braking action without bending knee. Simply releasing pressure on his left heel applies brake. Thus, operator stands squarely on both feet while truck is in operation.

Truck has three speeds forward and reverse which gives smooth acceleration and deceleration. New dual caster wheels and tandem load wheels provide support to load carrying frame, making high stacking possible. On straddle models, 9 point support improves load distribution and minimizes wear and tear on floors.

Truck is available in both high and low lift models. Capacities 2,000 and 3,000 lb. for high lift models. Low lift has 4,000 lb. capacity.—*Lewis-Shepard Products, Watertown, Mass.*

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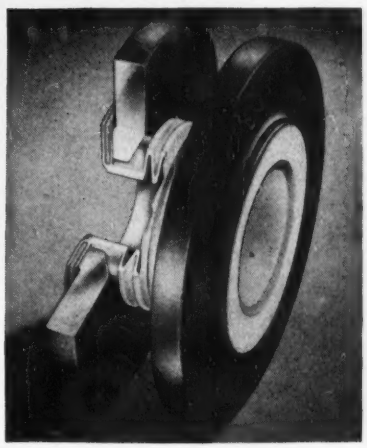

Pipe Expansion Joint Has Teflon Bellows

On these new bellows, made of chemically inert, corrosion and heat resistant Teflon, the companion flanges conform to American Standard bolt hole circles and numbers for pressures up to 125 psi. They can be supplied to fit any pipe size from ¼ to 12 in.

Bellows feature a new convolution form reported to give greater strength, longer life and increased flexibility. Since they retain formation at full free length, they are subjected to minimum residual and working strain. They expand and contract in either direction with equal freedom of motion. Operating temperature range is from −94 to +500 deg. F.

Bellow flanges are of French-type gasket construction to provide more efficient sealing at lower flange pressure. Gasket insert material is asbestos or synthetic rubber.

Typical applications include: Vibration dampeners, expansion joints and connectors. They are available in a wide range of designs suitable for metering pumps, pressure accumulators, batching scales, hydraulic systems and others.—*Crane Packing Co., 1800 Cuyler Ave., Chicago 13.*

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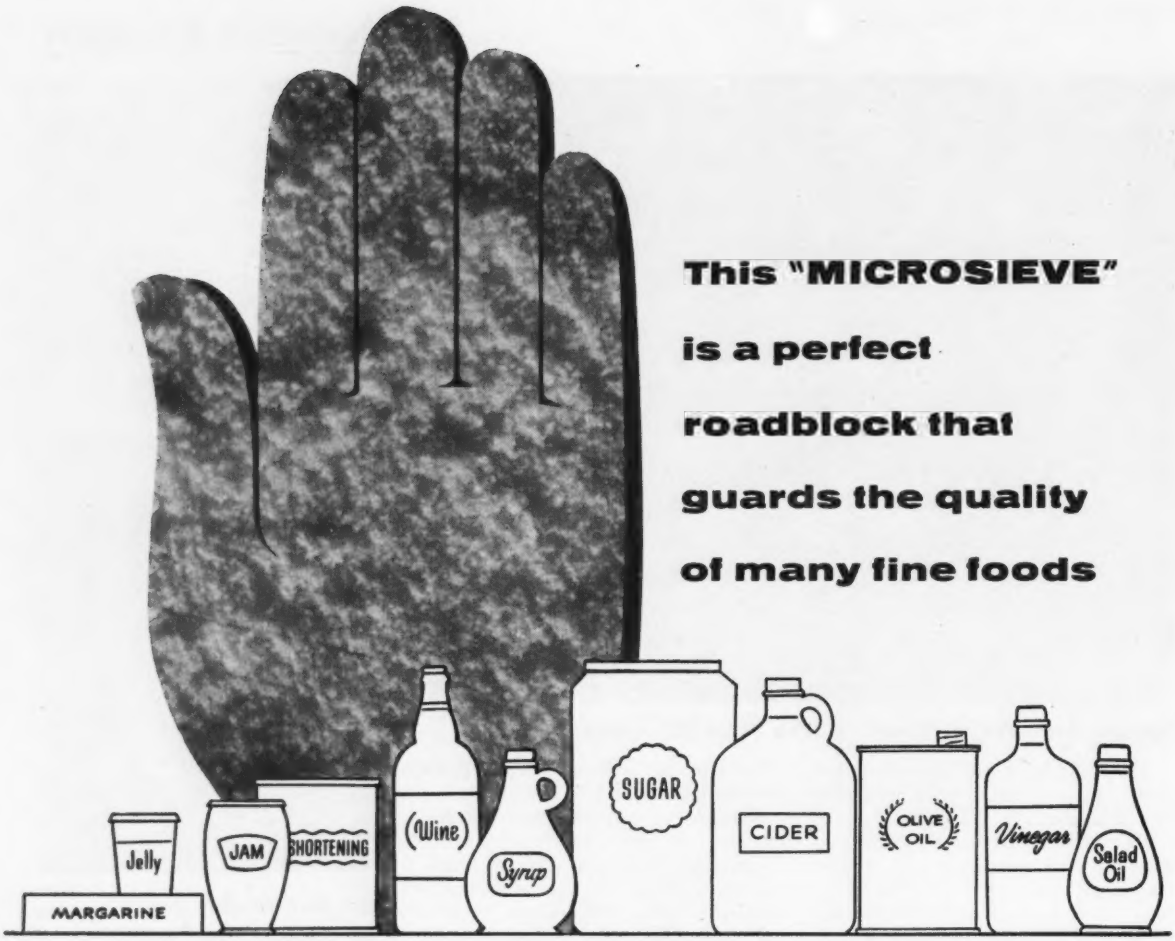


This "MICROSIEVE" is a perfect roadblock that guards the quality of many fine foods

No unwanted solids can pass this Dicalite filtercake—yet you get high throughput for full production. The reason is simple: only 10% of the filtercake is solid; 90% is voids, voids so tiny that even particles down in the colloidal and bacterial range can't get through. Decolorizing clays and activated carbon are caught and held; every trace of catalyst is removed from hydrogenated oils and fats.

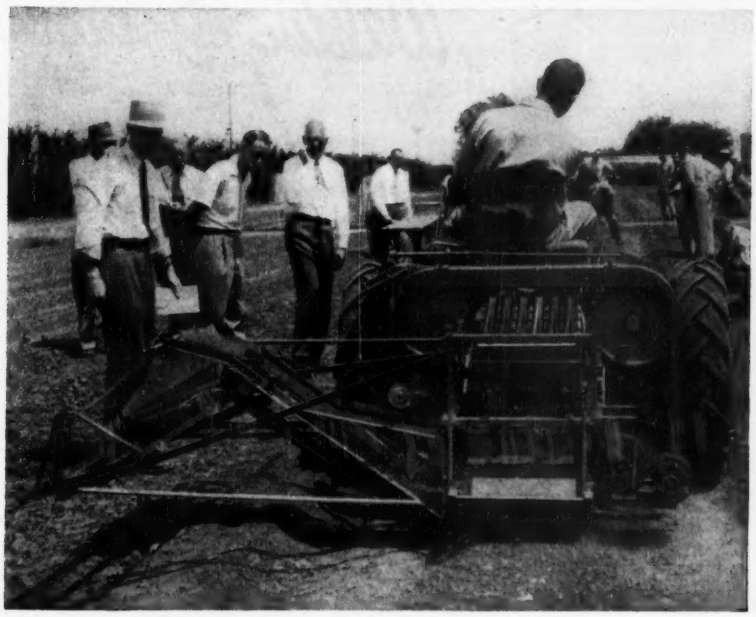
For brilliant clarity and purity of filtered liquids; for greater stability of finished product; for lower filtering costs; Dicalite Filteraids have no superior. Impartial laboratory tests and the experience of many food processors support this statement. Dicalite Filteraids are produced from the nation's highest-grade deposits of diatomite and are processed under strict quality controls to set a new high standard of excellence in diatomaceous filteraids.

For more complete data on filtration, write for Bulletin B-12.

Dependable GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION, 612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA

For more information, use coupon on page 233.



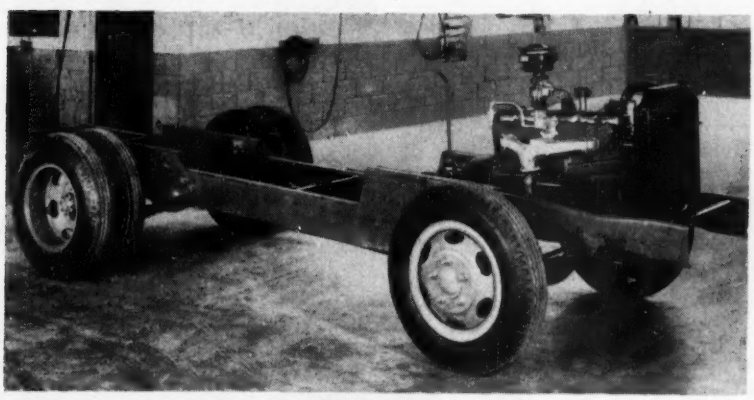
Asparagus Harvester Put Through Test Runs

This mechanical harvester, still in experimental stage, is expected to reduce cost of cutting green asparagus for cannery use by replacing 12 hand cutters.

Machine consists of a large drum with six rubber-lined, adjustable slots, which straddles raised row of asparagus and turns with tractor wheels. Gaping slots close firmly yet gently over asparagus spears and a bandsaw cuts spears off ½ in. below surface.

As drum turns, cut spears are released onto a belt and travel butt-end first up slope to left and are dumped into small troughs. Asparagus is kept in neat bunches by having one small trough at a time positioned at top of conveyor belt. Troughs shift automatically at prearranged intervals. Designed to cover a row width of 15 in., machine can be built to cover 30 in. or 36 in. row widths.—*Coll. of Agriculture, U. of Calif., Davis, Calif.*

Circle 175A on Reader Service Card



Truck Floor Lowered With "Drop-Frame" Chassis

Loading and unloading operations are speeded and eased when the truck floor height is lowered. Production of a new "drop-frame" chassis makes this feasible.

Using a 9 in. x 3 in. x ¼ in. straight rail, new chassis drops 9 in. at rear of cab, and only rise from there to end of frame is a kickup over the rear axle of 4¼ in.

Maker reports that normal loaded height of drop frame at rear axle of a 150-in. wheelbase chassis with 8.25 x 20 tires is 27-7/16 in. At end of frame the loaded height is 4¼ in. less.

Engineers have designed new frame so that its height with no load on chassis at rear axle is only 2¼ in. more than at normal load. Frame height of unit at end of chassis is about 10 in. lower than height of a conventional unit.

If a van-type body designed for drop frame is mounted, floor height from ground, with 9.00 x 20 tires, is only 33¼ in. at end of body. Available in all standard wheelbases, maker is working out a program for factory-installed bodies especially designed and produced for drop frame chassis. —*Reo Motors, Inc., Lansing 20, Mich.*

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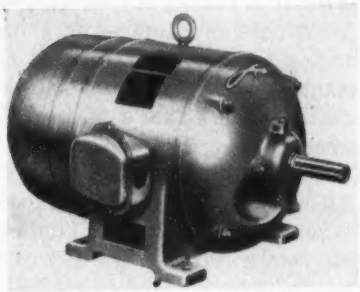


New Model Brakemotor Is More Compact

Short overall length is one of the features of this new integral brakemotor. Shorter length is made possible by utilizing motor end bracket as an integral part of brake. Development overcomes former space limitation restrictions.

Units utilize disk brakes and are available in NEMA motor frame sizes from 203 to 326. Brakes are designed to furnish maximum continuous duty torque from 3 ft.-lb. in smaller sizes to 50 ft.-lb. in largest.

New unit has a number of advantages, according to maker. An external wear indicator eliminates cover removal and constant brake-lining inspection. It shows that brake is operating properly at each engagement. Brake adjustment is also simplified since one torque-adjustment nut sets it for any rating to maximum.

Other advantages claimed include: Rugged construction with cast iron external parts for ability to stand up in severe service; a dependable brake lever system; maximum solenoid gap limit; and extra electrical protection. Long brake life and fast stops are provided by a one-piece molded friction lining of low inertia, according to company spokesman.—*Louis Allis Co., Milwaukee 7.*

Circle 175C on Reader Service Card

Waldin Smugg is Wrong

—NO MATTER HOW YOU SLICE IT

WHETHER YOU SLICE it or dice it, chop it or core it, comminute or atomize or grind it—you are reducing the size of it. Almost *every* kind of food plant has to reduce size somewhere along the production line. That's why Waldin Smugg is so wrong.

You see, Smugg makes a product called foodle. All he ever reads about is foodle processing. He never reads about *other* kinds of food plants. But his competitors do. So they're way ahead of him when a new size-reduction idea springs up.

They don't sit behind a wall of self-satisfaction, like Smugg, shutting out useful ideas that happen to crop up in plants "unlike" their own. They read FOOD ENGINEERING. FE helps each *kind* of food plant use the experience of the others.*

Yes, FE brings you new engineering and operating developments from plants *just like* your own . . . and others from plants that make different food *products* but have the same *problems.*

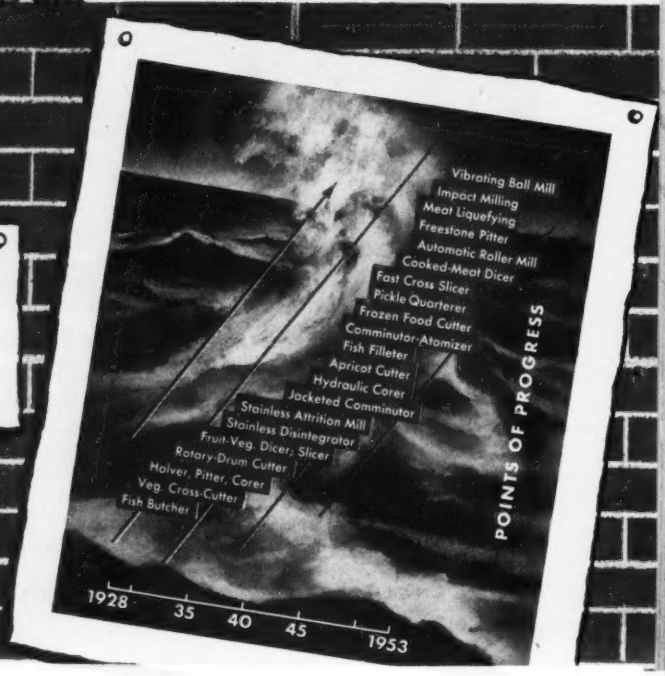
That's one big reason why FOOD ENGINEERING has more subscribers than *any* other food-plant magazine. There are other reasons, too: FE *specializes* in food-plant management, operation, and engineering. It has the biggest staff. It is backed by the unmatched facilities of McGraw-Hill . . . which FE editors use to scour all of American Industry for new ideas that food plants can use.

Every time they're asked what they read in industry-wide polls, food-plant operators name FOOD ENGINEERING their favorite, most useful magazine.

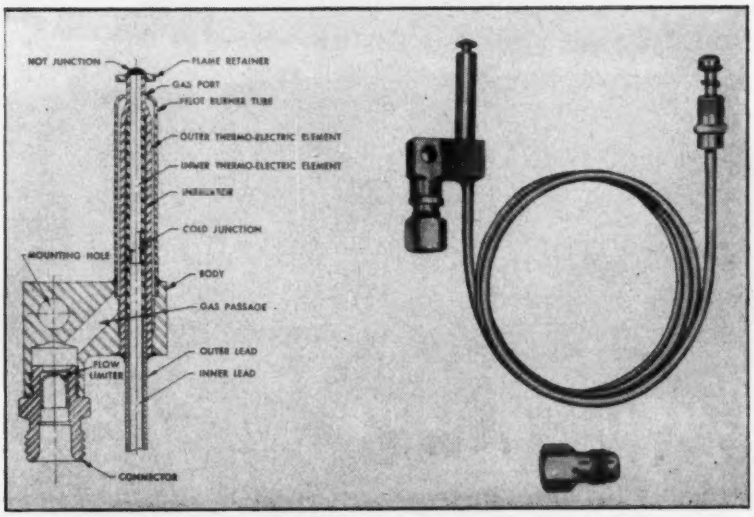
* * *

But behind his wall sits Smugg, cutting off his nose to spite his face. If you see him, tell him about FE. If you see him in your mirror . . .

LOOK OVER YOUR WALL WITH **FOOD ENGINEERING**



* **SIZE REDUCTION** is food-industry-wide. And every year, the "tidal wave of engineering" brings new methods, sweeping them from one kind of food plant to another. This graph shows how this has happened in the past. **FOOD ENGINEERING** helps you benefit from this "idea exchange."



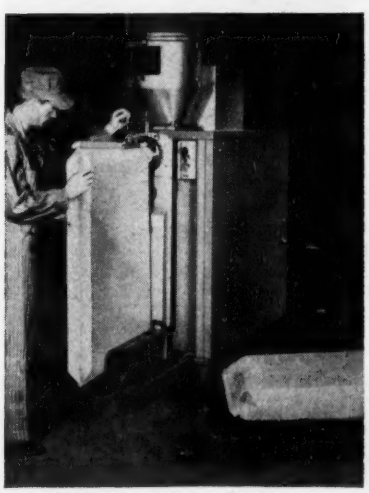
Improved Pilot Light for Automatic Gas Ignition

In this new automatic gas ignition device, the pilot burner and thermocouple are combined in a compact unit. Gas input is low, assuring economical operation and cool stand-by. Since it is non-aerated, the pilot, called Mini-Pilot, cannot become clogged with lint, thus solving a troublesome service problem.

An encircling blue frame on pilot head provides heat to built-in thermocouple, which is available in all standard lengths. New pilot may be used in conjuction with automatic shut-off devices for complete safety protection.

Unit has been thoroughly tested, and will handle all gases without changes in orifice, producer claims. It is silent in operation and can be installed in close quarters.—*Robertshaw-Fulton Controls Co., Robertshaw Thermostat Div., Youngwood, Pa.; Grayson Controls Div., Lynwood, Calif.*

Circle 177A on Reader Service Card



Multiple Action Filler For Valve Type Bags

In packing powdered, granular, pellet and fibrous materials, this new multiple action Auger-matic unit is reported to eliminate need for preweighing, and to assure tightly filled valve bags each containing uniform weight.

Previous models were equipped with a built-in scale which automatically shut off packer when desired weight has been reached. In new model, this scale has been redesigned to include a shaker which jolts each bag vigorously and repeatedly during filling process. This not only prevents any slack-filled bags, but also permits use of minimum size valve bags. Each bag arrives at destination just as full as when packed.

Another feature of unit is a security clamp which holds valve bag in place on filling spout regardless of force with which material flows from spout. Operator releases bag when packer shuts off by raising security clamp handle.

For users who pack fluffy or fibrous materials are inclined to clog or bridge in hopper a special unit with built-in positive feeding auger is available to insure free flowing of even those materials requiring agitation—without loss of speed in packing. This feedermatic unit is optional since it is not essential to efficient operation when the product being packed is a free-flowing material.

In operation, attendant slips valve free-flowing materials are being packed. over spout and presses a button to start the machine. Auger in spout feeds material into bag rapidily, with shaker settling material as it feeds into bag, then built-in scale shuts off machine automatically when desired weight is reached. Operator releases security clamp, slips bag from spout, tucks in valve and tightly-filled bag is ready for shipment.

Snug fitting spout minimizes dust hazards, prevents waste of materials and keeps bags clean with brand name and other printing free of dust. Packer can be mounted on casters for easy movement from one filling point to another.—*E. D. Coddington Mfg. Co., 5052 37th St. N., Milwaukee 9.*

Circle 177B on Reader Service Card

Vinyl-Faced Sponge Pad Cuts Worker Fatigue

Wherever people have to stand up to work, fatigue is minimized with this vinyl-faced sponge rubber padding. It is made of a strong non-staining sponge rubber compound, and has a fabric backing to provide stability.

Vinyl facing is designed to protect sponge rubber against abrasions from metal cuttings, etc., and provide longer wear than possible with ordinary rubber-skin type sponge. It also resists oils, alkalies, and other chemicals.

Product, Durapad, comes in 18 and 36 in. widths, from $\frac{1}{8}$ to 1 in. thickness, and in any length up to 40 yards. Colors are dark green, red-brown, gray and black. Pad cleans easily with soap and water, or solvents.—*Industrial Div., Durkee-Atwood Co., Minneapolis 13.*

Circle 177C on Reader Service Card

Trim costs with this hook-up for valve-killing corrosive services

To end high valve mortality from most corrosive liquids, and to control fluids that must be kept free from contamination or discoloration, stainless steel is the right metal. But it takes more than metal to make a valve. For dependable performance, you need the two-way hookup — Stainless Steel *and* Jenkins time-proved Valve Engineering.

With the increased demand for processing equipment that resists corrosion, more and more Stainless Steel Valves have been added to the Jenkins line. It now includes types, designs, sizes and alloys to meet practically all industrial needs.

Let the famous Diamond trade-mark be your guide when you choose valves of stainless steel. As on *any* Jenkins Valve, it means *extra value* . . . longer, trouble-free service life.

NEW BOOKLET describes the wide range of types, sizes, pressures, and alloys available in Jenkins Stainless Steel Valves, with diagrams and dimensions. Includes description of alloys, helpful information on selection, and survey forms. Ask for Form 200. Jenkins Bros., 100 Park Ave., New York 17.

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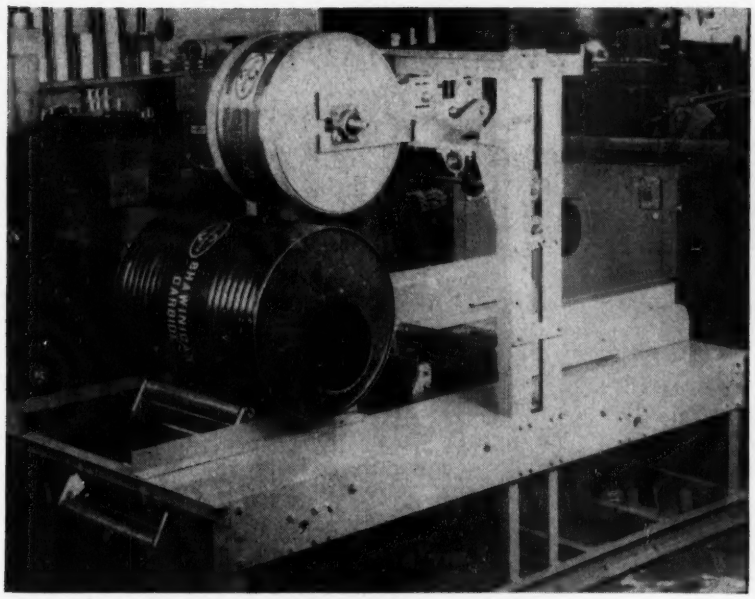

Automatic Unit Simplifies Drum Printing

This new machine automatically prints 100 and 250 lb. drums at the rate of 15 per minute.

Machine makes possible in-plant printing. Operator loads drum onto cradles which then position it under continuously revolving printing wheel which spins and prints drum. The drum is then ejected. Different diameters of drums are taken care of by raising and lowering elevation of the printing heads.—*Industrial Marking Equipment Co., 454 Baltic St., Brooklyn 17, N. Y.*

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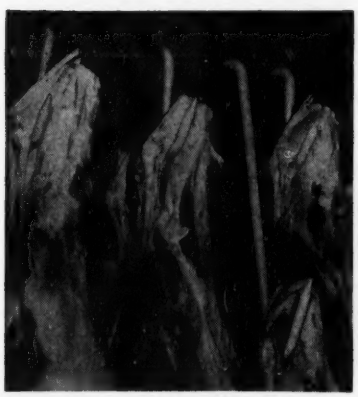

Aluminum Meathooks For Higher Payloads

In the hauling of "hanging" meat, dead weight is decreased and payload upped with use of these new forged aluminum meathooks. Further, aluminum provides extra savings through longer useful life and lower maintenance costs.

A typical motor truck trailer carries 350 hooks (200 long and 150 short hooks). In aluminum these effect a weight savings of approximately 450 lb. over the conventional galvanized steel meathook, and permit additional payload.

Manufacturer has done experimental work to determine correct coating to withstand wear and abrasion of constant meat transportation service without "smudging" the product.

New hooks have a coating of aluminum oxide. They can be inexpensively recoated, and will provide service indefinitely. A strong, heat-treated aluminum alloy insures plenty of strength in the hook.

Meathook with coating has received U. S. D. A. approval for hanging government inspected and approved meat products.

Handbag ease and small amount of maintenance are important advantages claimed. They offer a definite advantage for packing houses, because of their resistance to salt in atmosphere generated from brine used in refrigeration.

Hooks are furnished in two sizes. Large, 23¾ in. long, weight 1 lb., small 8 in. long, weight 0.48 lb.—*Aluminum Co. of America, 727 Alcoa Bldg., Pittsburgh 19.*

Circle 179B on Reader Service Card

Snap-On Pipe Insulation Made of Glass Fibers

Savings of 20 to 50% in installation costs are reported with use of Snap-On pipe installation on hot and cold piping ranging from ¾ to 24 in. dia.

Product, one-piece molded material of fine glass fibers, is suited for insulating all chilled and refrigerated lines, all heated lines where temperatures do not exceed 350 deg. F. It can also be used as a second layer on high temperature lines.

Insulation is available in 3 and 6 ft. lengths, depending on pipe size. Small pipe sizes (dia. up to 2 in.) will be in 3 ft. lengths. Wall thicknesses of ½, ¾, 1, and 1½ in. are available in sizes to 12 in. pipe size; and 1, 1½, and 3 in. wall thickness for piping above 12 in. dia. One-piece sections speed up application thereby reducing installation costs.

Properties claimed for insulation are: It will not break in shipment or on job; virtual immunity to damage from wetting or bumping; light weight permits one-man application. Highlight feature is thermal efficiency (K factor of .23 at 100 deg. F. mean).

To install, user simply spreads section open at single seam and snaps it over pipe. Seam is joined tightly with staples or other conventional means. Material can be painted, left "as is" in concealed spaces, or finished as desired. It is also available with factory-applied vapor barrier for cold piping and with a weatherproof roofing paper for outside lines. Material will not flake or crumble when dry, won't get muddy or messy when wet. It can be cut with a knife. A 3 ft. section ¾ in. dia. size, ½ in. wall thickness weighs only 8 oz. It is dustfree, contains no coarse irritating fibers and will not shrink on pipe—*Gustin-Bacon Manufacturing Co., 270 W. 10th St., Kansas City, Mo.*

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(ADVERTISEMENT)

INSIDE SCIENCE

The Vital Story of MARGARINE FORTIFICATION

How They Made Margarine a Better Food

by Science Writer

Over a hundred million pounds of margarine are used a month as a table spread, a tasty seasoning for hot vegetables and for many other purposes in cooking and baking. Included in the "Basic 7" food list, it serves as one of the finest and most concentrated energy foods. It is a shining example of a food which has been made repeatedly better.

In the original product which was invented more than 80 years ago, beef fats were used. Later these were replaced by lard and then by vegetable oils. When raw the latter, however, had several drawbacks: an unpleasant odor and taste, unsatisfactory color and a low melting point. These have been overcome by scientific refining methods, hydrogenation and use of certified food colors. Strictly phrased Federal Standards sponsored by the industry assure maintenance of very high quality, uniformity and nutritional value.

With this history of product improvement, it was natural that margarine makers would make their food a more valuable one by the addition of vitamin A. For over a decade many brands of table margarine were marketed with a label statement that they contained 9,000 International Units of vitamin A per pound. Now virtually all brands are fortified with vitamin A and the minimum amount supplied per pound is 15,000 I.U., an increase of over 66%.

Here are some of the benefits which vitamin A supplies. Scientific evidence is available showing that it helps to maintain normal vision and to overcome night blindness; that it increases the body's resistance to infections; that it promotes physical and mental development; and that it aids in maintaining normal glandular function.

Margarine makers who were accustomed to "fishy" odors and flavors when buying vitamin A sought a new source of supply. They found this new source in synthetic vitamin A—as produced by the famous synthesis evolved by the Roche research team headed by Dr. Otto Isler.

It was natural that margarine makers would adopt synthetic vitamin A for fortification of their products. When they were dependent on vitamin A extracted from fish liver sources, they found wide variations in vitamin A price. Synthetic vitamin A eliminated this disadvantage because its price is reasonable and stable. And a second disadvantage disappeared because synthetic vitamin A has absolutely no "fishy" odor, or taste, or after-taste!

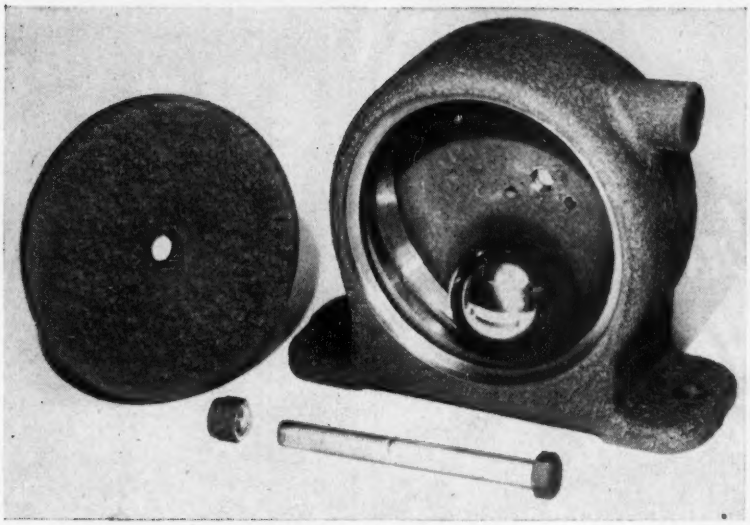
Pure vitamin A and concentrates of it, produced by the Roche synthesis, have been approved by the Food and Drug Administration for use in margarine and other foods. It is light and clear in color.

Starting with citral, obtained from lemon grass oil, Roche vitamin A is built up through twelve manufacturing operations into a molecule identical with Nature's own.

At the huge Roche Park plant of Hoffmann-La Roche over 500 pieces of large-scale chemical engineering equipment in a multi-million dollar plant are working constantly to produce the superior Roche vitamin A.

Again, a development by the Roche people, who manufacture not only vitamin A but many other essential vitamins by the tons, has contributed to the making of a more nutritious food—and thus to the public welfare.

This article, reprints of which are available without charge, is published as a service to the food industry by Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West, Montreal, Quebec.



Ball Vibrator Is Quiet, Easy to Maintain

An air-operated moving ball-type vibrator now moves bulk materials with minimum noise and no maintenance.

Known as the Airoviber, it breaks up arching and jamming in places where bulk materials hang up. Unit can also be used on vibrating tables or platforms. Having only one moving part, a steel ball, the vibrator requires no lubrication or any type of maintenance operation.

Easy to install, it performs at high or low temperatures and is not affected by humidity, contaminated atmospheres or air supply. By opening or closing air valve supplying unit, speed and amplitude of vibration is controlled.—*Viber Co., 726 S. Flower St., Burbank, Calif.*

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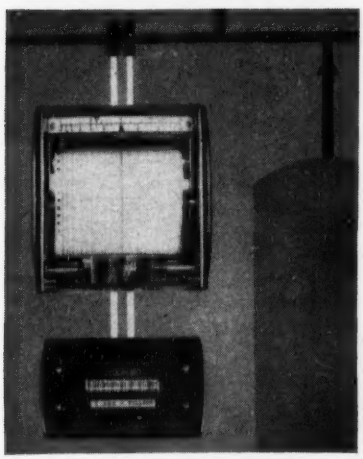

Graphic Panel Instrument Records Flow Totals

For use with graphic panels, this new receiver-integrator, a pneumatic-electric instrument, computes an accurate and continuous total of any process flow and operates a small counter located in the display.

Integrator of new Type 224 instrument consists of two small self-contained units: remote counter and flow receiver. Counter can be mounted on front of a panel, usually in conjunction with strip-chart flow recorder and totalizes to eight digits (or to six digits with zero reset wheel). Space required is 3¼ by 5½ in. Flow receiver unit, composed of a receiver bellows and a cam-switch assembly, is housed in a small metal box behind panel. Two wires connect it to counter.

In operation, pneumatic measurement signals (3-15 psi.) from a flow transmitter at process are received by bellows, which then positions cam-switch mechanism. Cam-switch, in turn, produces an electric-impulse to actuate counter in precise and constant relation to flow measurement.

Integrators are available for uniform or square root scales to totalize minute, hourly or daily rates. Service calibration checks can be made during actual operation with no extra equipment. Developed chiefly for graphic-type panels, unit is equally suited to control cabinet installations where compact instrumentation is desired.—*Foxboro Co., Foxboro, Mass.*

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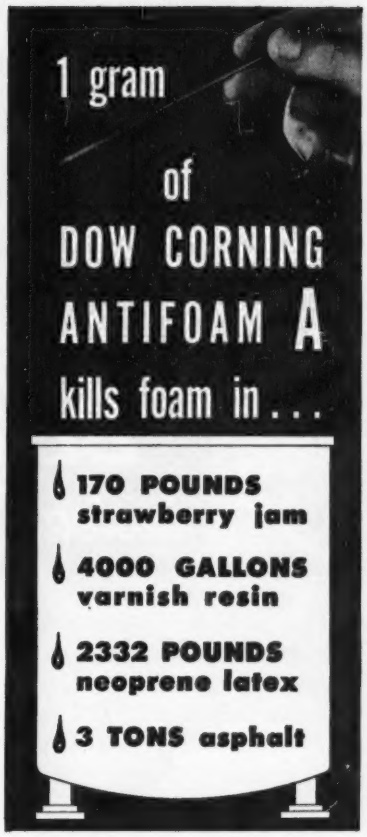

Effective at very low concentrations, Dow Corning Antifoam A Compound is the most economical, the most efficient and the most versatile foam-killer ever developed. Odorless and tasteless, this silicone defoamer is physiologically harmless in foods at concentrations up to 10 parts per million. Thousands of chemical and food processing plants depend on Dow Corning Antifoam A to cut processing time, to save productive capacity now wasted on foam, and to eliminate wasteful and hazardous overflow.

DOW CORNING ANTIFOAM AF EMULSION

is a dilutable defoamer containing 30% Antifoam A. It is easily dispersed, equally versatile and equally effective against aqueous foamers. It is safe to use in food processing at concentrations up to 10 parts Antifoam A per million parts of the foamer.

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and make LARGE SAVINGS

Check with some of the most successful manufacturers, and you'll find that they are now making cartons in their own plants—from low-cost die-cut blanks.

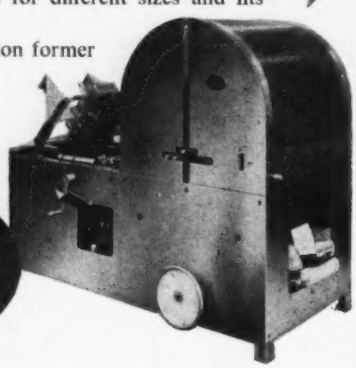
The machine they are using is our Model PA, which forms and glues up to 100 cartons a minute—and occupies only 3′ by 6′ of floor space. It requires virtually no attention while running. Operator merely keeps it supplied with blanks.

Savings usually pay for the machine in less than a year.

The Model PA can be adapted to form virtually any type of single or double-walled carton, using any carton stock, including corrugated material. It is adjustable for different sizes and fits readily into any packaging set-up.

Let us show you how the PA carton former can reduce your carton costs.

Write for literature



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NEW YORK PHILADELPHIA BOSTON CLEVELAND CHICAGO ATLANTA DALLAS
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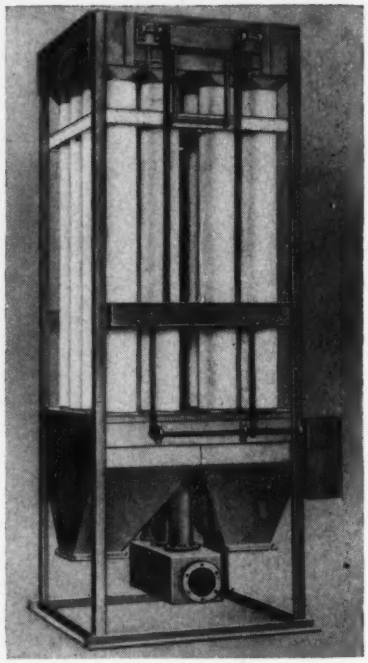

Fine Particle Collector Has Reverse Jet Cleaner

This newly developed dust collector is a reverse jet fabric unit designed for those applications where extremely fine particles are involved or where material must be collected in a dry state for reclaiming.

Cleaning media is automatically reconditioned by a jet of high pressure air forced through the cloth in opposite direction to flow of air being cleaned. Because cleaning cycle is continuous, unit maintains a constant pressure drop.

This method of media reconditioning permits high velocities through cleaning tubes minimizing filter cloth needed and size of dust collector. —*American Air Filter Co., Inc., Louisville, Ky.*

Circle 182A on Reader Service Card

Pocket-Size Calculator For Duct Designers

Air-flow pipe size problems can be quickly solved with the aid of a new pocket-sized calculator. Starting with known factors of air volume (cfm) and velocity (fpm.), friction loss per 100 ft. of duct (in. of water), required round duct diameter or rectangular duct dimensions (in.) can be read off directly on calculator scales.—*Safety Car Heating and Lighting Co., Inc., New Haven 4, Conn.*

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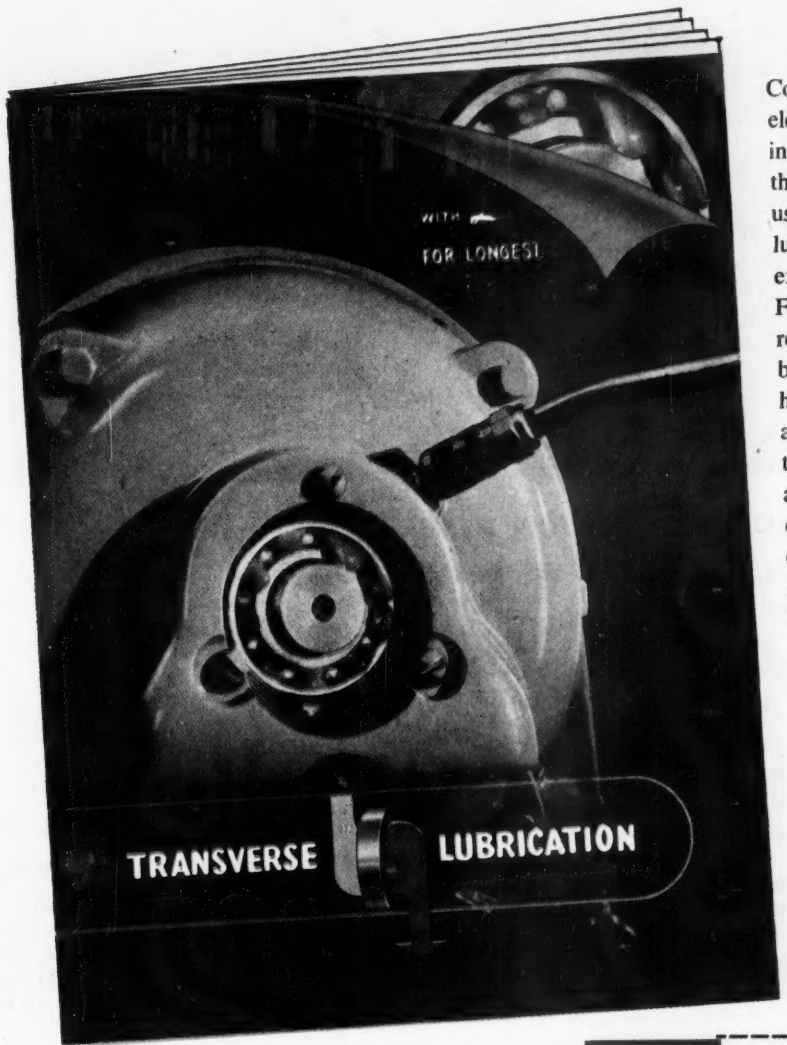
Startling Facts

ABOUT MOTOR BEARING LUBRICATION

FREE!... ...THIS FULL-COLOR PROFUSELY ILLUSTRATED BOOKLET OF FACTS THAT HAVE A BEARING ON THE LIFE OF YOUR MOTORS



Comparisons of methods for lubricating electric motors are interestingly depicted in this new booklet. It illustrates the three principal types of bearing systems used in motors—cartridge, one-side lubrication and Lubriflush—with explanations of the functions of each. For demonstrating the action of re-lubrication in the U. S. Lubriflush bearings, a transparent bearing housing is dramatically illustrated by a series of natural color photos. Proof that any motor bearing breathes air and therefore leads to contamination of the bearing is photographically demonstrated to indicate the necessity of lubrication every year or so. Excerpts of statements by leading bearing manufacturers about the necessity of motor lubrication are presented. This informative educational booklet, edited by lubrication engineers, is full of startling facts you should know. Write today for a complimentary copy. Simply fill in the Coupon below.

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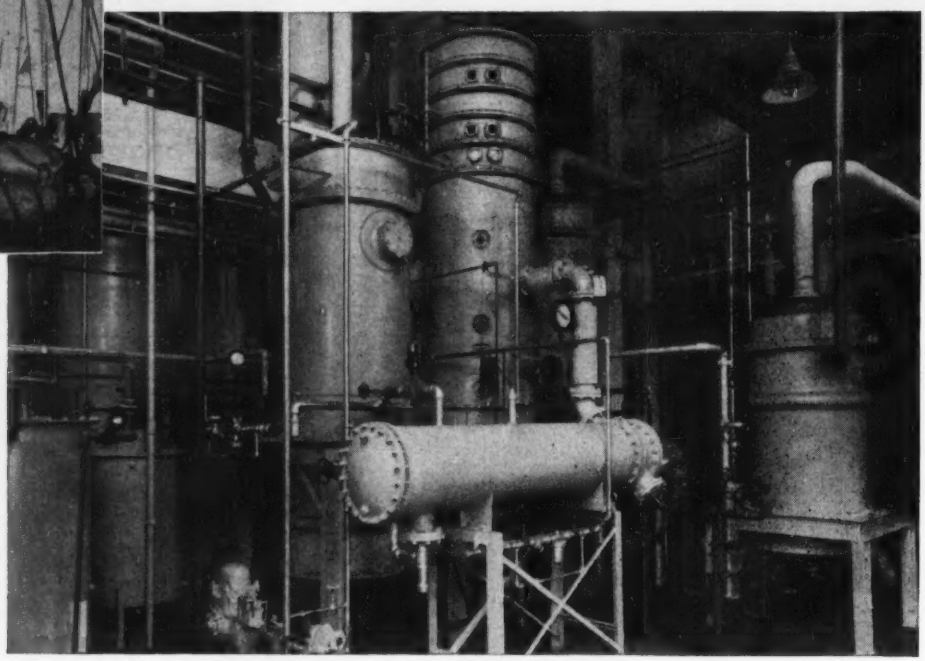

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Pepperoyal is no ordinary soluble pepper. Use the same amount of Pepperoyal in every batch of your product, and every batch will smack of the same pure pepper flavor.

True, it is processed from prime quality pepper berries. But, its real quality distinction originates in the Griffith laboratories. The potency, purity and uniformity of pepper flavor in Pepperoyal is controlled by our exclusive process of extraction.* It assures you of the same flavor quality in every shipment of Pepperoyal, or any of Griffith's Solublized Seasonings.

A real contribution to the flavor control of your products! Let's talk about it.

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Laboratorios Griffith do Brasil, S.A.—Caixa Postal 300 Mogi das Cruzes, Est. S. P., Brasil

Provides Steam, Wet or Dry, for Cleaning

Rapid cleaning of motors, compressors, condensers, and other machinery without necessity of dismantling, can now be done with the new "Steam Kleen" jet sprayer.

Steam jet feed is operated by finger tip control. Changeover from wet to dry steam is accomplished by merely tilting unit from horizontal to vertical position. It degreases as it cleans.

Light weight makes device readily portable. Actual weight is approximately 16 lb., ready for operation. Sprayer has a capacity of ½ gal. of water and can be brought up to operating temperature and pressure in 20 min. using cold water. With hot water, waiting period is considerably shortened.

Normal degreasing and cleaning time is approximately 20 min. Unit is electrically heated, thermostatically controlled, and operates on any 110 and 115v. circuit. It is fitted with a steam safety valve. Unit is manufactured to comply with ASME Miniature Boiler Code.—*Henry Flow Controls Co., Melrose Park, Ill.*

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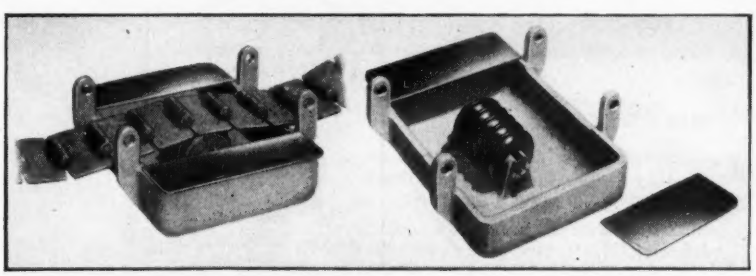

Improved Conveyor-Lubricator Cuts Bottle Breakage

Reduced wear, smoother operation and less bottle breakage are advantage claimed for a new type roller-chain lubricator. Lubrication also keeps the bottle conveyor both clean and sanitary.

Field tested for four years, unit provides positive lubricating action. It operates only when conveyor is in motion, hence there is no waste, excessive sudsing or dripping on floor.

Unit is designed for mounting under return conveyor chain. Chain is lubricated as it passes over "O" ring equipped roll, which is immersed in lubricant pan. Lubricator for a single (4½ in. wide) track will hold from one to five rings; unit for double (8⅝ in. wide) tracks will hold twice as many. Rate of application is varied by simple addition or removal of the required number of "O" rings.

Lubricant, whether liquid or semi-solid, can be added while conveyor is operating. One fill is usually sufficient for a day's operation. Maintenance is negligible as there is no spigot to become clogged and lubricator is sturdily built.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

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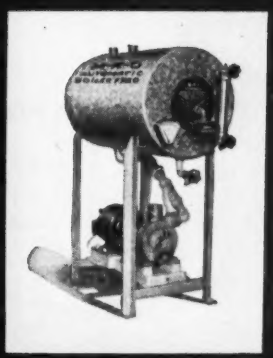
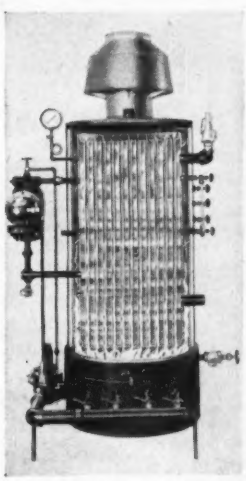


M-K-O AUTOMATIC BOILER FEED UNIT..

Returns Condensate and Make-up Water, Keeps Constant Water Level

M-K-O- AUTOMATIC BOILER FEED UNITS are designed to *automatically* pump hot condensate, plus any required make-up water, into a boiler, *without manual attention:* to maintain a practically constant water level at the point most economical for highest boiler efficiency; and to supply small quantities of hot water to the boiler at frequent intervals, thus eliminating the steam pressure drop incident to the old method of injecting large quantities of cold water at infrequent intervals. Boiler life is also prolonged by feeding hot water instead of cold water.

Our helpful, new Boiler Feed Bulletin, No. 4G, will gladly be sent upon request.



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CHURCH ROAD, BRIDGEPORT, PA.

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108-22 Queens Blvd., Forest Hills 75, N. Y.

Model 942

Speed, accuracy, compactness and large capacity are combined in this model. Ideal for institutional-size packaging, checkweighing, and ingredient compounding with weighments up to 50 pounds.

EXACT WEIGHT Scales Give Accurate Readings FAST

In addition to providing outstanding accuracy, EXACT WEIGHT Scales are FAST! An adjustable hydraulic damping mechanism brings weight indicator to rest quickly, and visible fractional-ounce indication enables operator to make an accurate reading at a glance. There's an EXACT WEIGHT model with the correct capacity and sensitivity for every packaging, checkweighing, or sacking operation in the food industry.

Model 213

Compactly built, requires small counter space. One inch indicator travel equal to two ounces. Three pound capacity.

Sales and Service from Coast to Coast

There is no substitute for Exact Weight

Exact Weight Scales

Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

910 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P. O. Box 179, Station S, Toronto 18, Ont.

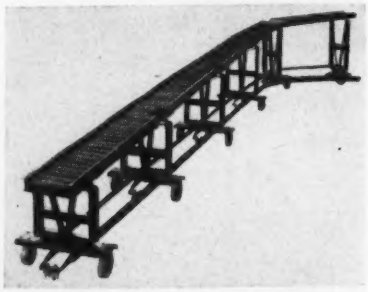
Send full details on ( ) Model 942 ( ) Model 213

Name .....

Address .....

City .....Zone ....State .....

Equipment & Supplies

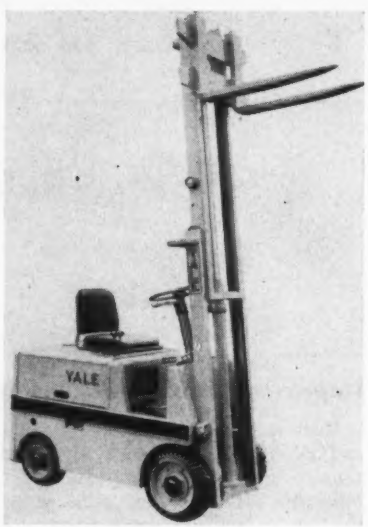


Hinged Sections Permit Curved Conveyor Travel

This portable assembly gravity conveyor, mounted on supports equipped with wheels, has several sections connected with hinged joints to permit travel around a curved floor track.

This flexibility allows conveyor to be placed in position for use, and to be withdrawn for storage. Curved track is fastened to floor and special cam rollers engage track and guide equipment around path. Switches in track allow use of equipment for two different loading stations. Conveyor widths can be varied to suit conditions. —*Alvey Conveyor Mfg. Co., 9313 Olive Street Rd., St. Louis 24.*

Circle 186A on Reader Service Card

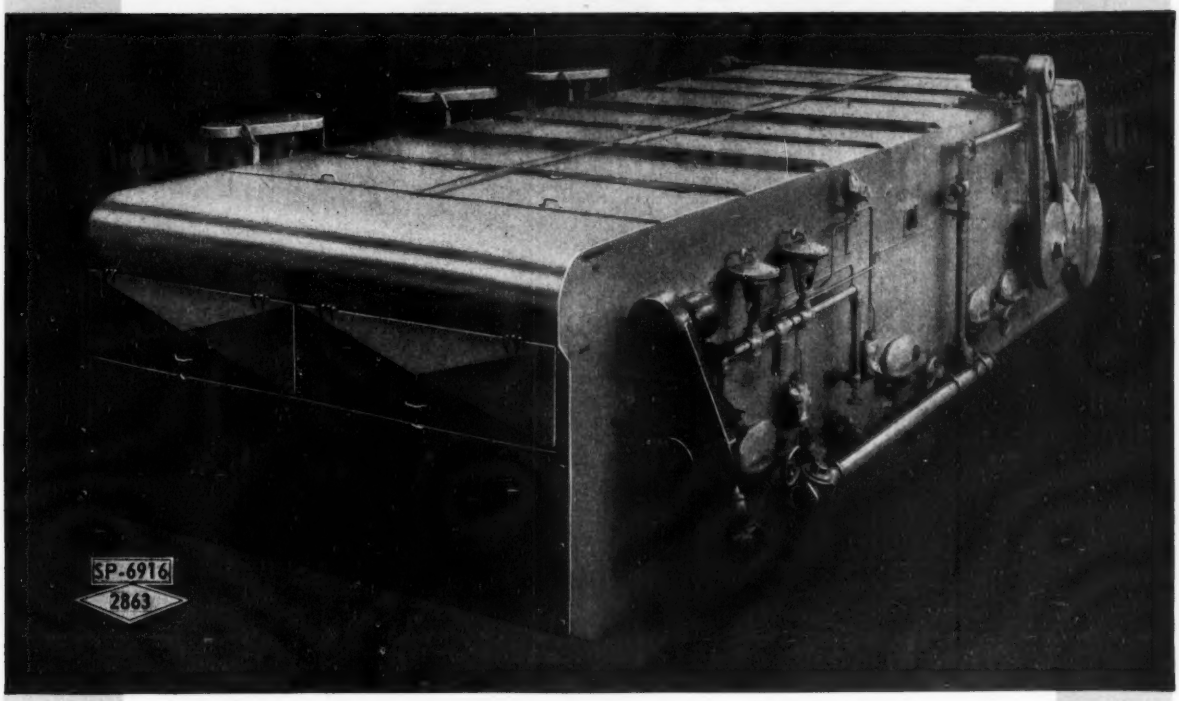


Gasoline Lift Truck For Narrow Aisles

Compactness, increased power and maneuverability are stressed in a new line of gasoline lift trucks. Called the G-52 Series, trucks are available with pneumatic or solid tires in 2,000, 3,000, and 4,000 lb. capacity model.

The 2,000 lb. truck can negotiate a right angle corner in a 57 in. aisle

THE MEYER *Cataract* FOOD PROCESS UNIT



for Pasteurizing, Cooling and Exhausting

A MEYER Cataract Food Process Unit is backed by 50 years experience in building efficient bottling equipment including Pasteurizers for the Brewing and other Beverage Industries and processing units for the grape Juice Industry.

The MEYER Cataract Food Process Unit is built for efficient processing. Food products may be cooled, heated or heated and cooled with the MEYER Food Process Unit at very high efficiency. The entire process of heating the product to a pre-determined temperature and/or a subsequent cooling, is accomplished within a single unit. It has proved highly efficient in a wide variety of applications, since 1939.

Designed to minimum floor space, feed at one end, discharge at the other end; also built in Multier design where floor space is limited.

The entire cooling or heating or heating and cooling operates on a continuous basis, under mechanical control. Product handling, waste water and labor requirements are minimized. Sanitary design provides for quick cleaning and visual inspection of all surfaces contacting the product packaged.

The MEYER Cataract Food Process Unit is designed for products in any and most forms of the prevailing size of glass or tin containers, likely to be adopted, from any diameter to 12½" high and particularly where one unit is to handle all types. Provisions can be made to handle containers of larger heights. Tell us of your requirements.

USED THE WORLD OVER — Dumore — BOTTLING EQUIPMENT

50TH ANNIVERSARY 1904 – 1954

GEO. J. MEYER MANUFACTURING CO.
CUDAHY, WISCONSIN

For more information, use coupon on page 233.

Freezing Operations Better to destination!

Remember

RUBATEX *Insulation Hardboard*

*Makes More Cents**

Control of heat leakage into trucks is of major importance in delivery of shipment at guaranteed temperature. Short or long haul shippers rely on the low heat conductivity of Rubatex for positive temperature control to prevent costly spoilage of perishable goods.

PLUS

* Exceptional light weight of Rubatex — only 4½ lbs. per cu. ft. — lowers truck operation costs.

* Excellent structural strength — 60 p. s. i. — assures less maintenance and repair — stands up under tough duty jobs.

* May be installed just as received from factory — no water vapor barrier need be applied.

* Zero moisture pick-up prevents surface and internal condensation—resists deterioration—prevents mold and food spoilage.

TYPICAL INSTALLATIONS

A & C Trucking Equipment
Newburg, N. J.

Barry & Bailey Company
Philadelphia, Pa.

Carley Trailer & Equipment Co.
College Park
Atlanta, Ga.

Fulton Packing Co.
Boston, Mass.

Trailmobile Co.
Cincinnati, O.

Write for our "Design Data Bulletin RBH-53", Dept. FE-10, Great American Industries, Inc., Rubatex Division, Bedford, Virginia.

PIONEER MANUFACTURER OF CLOSED CELLULAR RUBBER

RUBATEX CLOSED CELLULAR RUBBER

or right angle stack in a 112 in. aisle. Built on a 43 in. wheelbase, its overall length is only 72 in. Height to top of steering wheel is 50½ in. and to top of channel as low as 68 in. Overall width to outside of tires is 32½ in.

Powered with a 25 hp. engine, it reaches a top speed of 8 mph. through a transmission with two speeds forward and two speeds reverse. Speed is controlled by a governor. Directional control gear shift is conveniently located on steering column. To get forward motion, shift lever is moved forward. To get reverse, lever is moved backward. Gear shift is mounted on steering column. Lift speed without load is 55 fpm., with full load, 50 fpm. Lowering speed ranges from 65 with no load to 75 fpm. with full load.—*Yale & Towne Mfg. Co., Philadelphia.*

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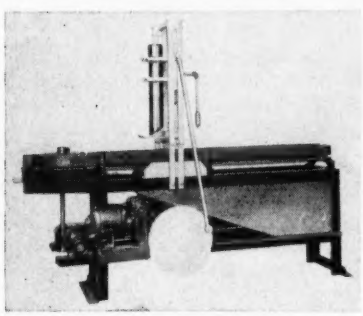

Automatic Can Opener Expedites Handling

Clean, straight-line handling is reported with use of a new automatic can opener claimed to do the work of four men. Called The Burgee Automatic Can Opener, unit opens, empties and rinses up to 20 No. 10 cans per minute. It handles any liquid or semi-liquid that will drain from a 4 in. opening.

Cans are fed automatically to a point under a hollow stainless steel cutting bit. Bit pierces both top and bottom of can and also dishes bottom for perfect drainage. Product drains into stainless steel underpan. A spray nozzle rinses cans thoroughly. Amount of rinse water is easily controlled. Opener prevents loss due to spilling or splashing of contents.

Dimensions are: Length 10 ft., 1¼ in.; width 34 in. Motor is ¾ hp. 220-440 v. 60 cycles 3 phase. Net weight is 806 lb. Pump is optional.—*F. H. Langsenkamp Co., 237 East South St., Indianapolis, Ind.*

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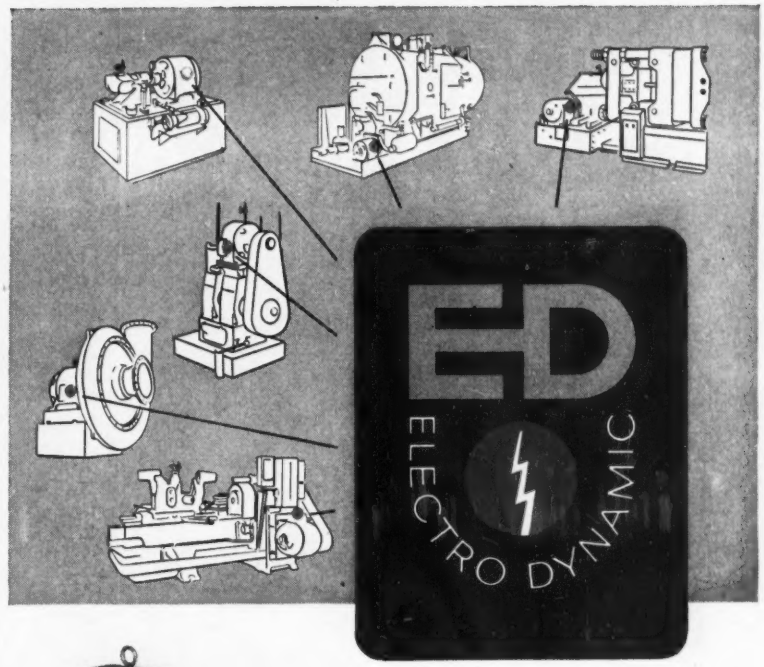
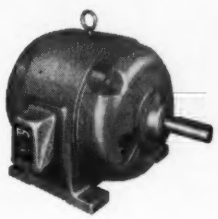
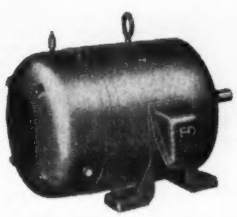




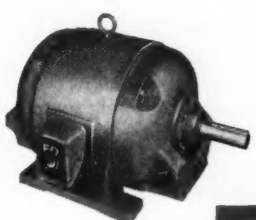
THIS EMBLEM IDENTIFIES EXTRA DEPENDABLE INDUSTRIAL MACHINERY



The red *power spot* on industrial machinery means "Powered by Electro Dynamic." Such machinery relies with confidence on the *extra dependability* of Electro Dynamic motors, the proven industrial motors which give industrial equipment *extra dependable* operation.

Conclusive evidence of the *extra dependability* of Electro Dynamic motors is now revealed in the new candid report **"MOTOR SHOWDOWN"**. The revealing proof is found in *comparative tests** conducted in accordance with A.I.E.E. standards. Don't miss your copy! Send the coupon below *today*.

*Tests certified by J. Arthur Balmford, Professor of Electrical Engineering at a leading Eastern university.



1 to 250 hp. AC and DC. Standard or special purpose. N.E.M.A. standards.

ELECTRO *xtra* DYNAMIC *ependable motors*

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Please send me a copy of "MOTOR SHOWDOWN" and the new catalog of Electro Dynamic industrial motors.

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For more information, use coupon on page 233.

production line...

or shipping room

Nearly 50 years of conveyor experience

Standard cuts conveying costs in *either* or *both* places

To speed operations, reduce breakage, increase safety, save manpower, time and money — mechanize handling with Standard conveyors. *It's an investment in efficiency that will pay you for years.*

Standard can be of expert service to you on any conveyor need. This includes complete engineered systems of conveyors for production, assembly or packing lines . . . or a simple lightweight section of roller conveyor for "spot" use in warehouse or shipping room.

Standard designs and builds all types of "package" conveyors: power and gravity, belt, roller, slat, push-bar and special units as well as a wide line of self-contained portable work-savers.

The range, versatility and flexibility of Standard Conveyor equipment have been developed in nearly 50 years of service to industry. Call Standard's representative listed in your classified phone book. Send for Standard's General Catalog — address Dept. FE-104

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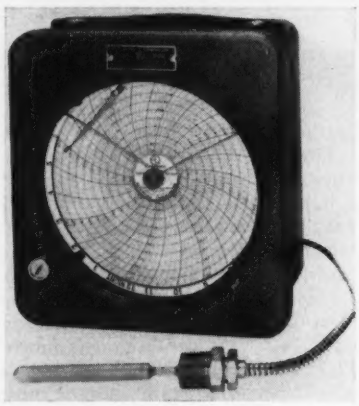
PNEUMATIC TUBE SYSTEMS

Equipment & Supplies



Temperature Recorder Is Easy to Read

Included in a new line of industrial temperature recorders are 7-day and 24-hr. models that feature a 6 in. clear-reading, evenly-calibrated chart, available in − 40 deg. to + 550 deg. F. ranges.

New Model 1000, electric or mechanically-driven, is available in portable, wall-mounting and self-contained units. Portables may be had with capillary tube on spool in back, or in self-contained type. The recorder has an aluminum die-cast case 7⅛ in. high, 6⅝ in. wide and 3 in. deep, and may be had with cycle indicator.— *Electric Auto-Lite Co., Toledo 1, Ohio.*

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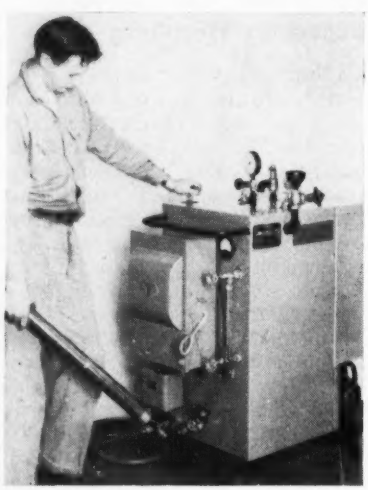
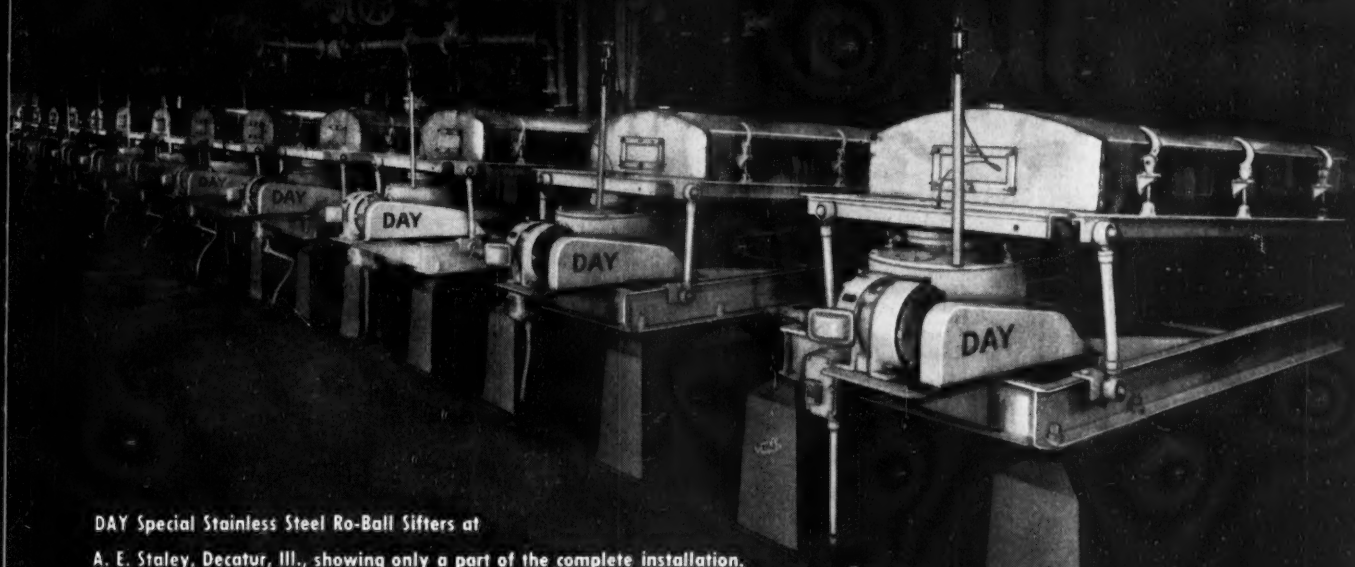


Steam Jet Cleaner For Tight Spaces

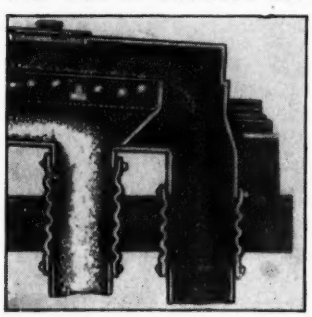
Fast, in-the-plant, cleaning is reported with a new steam-jet cleaner, called the "Standard". New unit is lower, lighter than original model and more easily maneuvered in areas where

DAY means longer life span



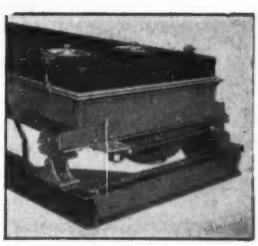
DAY Special Stainless Steel Ro-Ball Sifters at
A. E. Staley, Decatur, Ill., showing only a part of the complete installation.

*Extra long life for your equipment is assured by DAY's unmatched ability to combine rugged construction with precision engineering. An impressive list of users have found this true of the DAY Ro-Ball Sifter, which accomplishes 100% elimination of foreign material and ideal aeration. Key to its outstanding performance is the Super-Active Ball Cleaning Device. Scores of rebound points are provided in each compartment, resulting in even vibration over the entire screen surface. The extremely fine mesh stays clean and open, allowing free passage without crushing or forcing.



SUPER-ACTIVE BALL CLEANING DEVICE

Dust-proof Inspection Ports, with cast aluminum rim and cover, are precision-fitted. For complete information on these and many other features—including self-aligning tail end bearings, stabilizing drag link, and stabilizer to prevent rocking—simply call your nearest J. H. Day field engineer or write us direct for Bulletin.



SELF-ALIGNING TAIL END BEARINGS

FOUNDED 1887

when you buy **DAY** *you buy dependability*

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PRODUCERS OF QUALITY EQUIPMENT FOR BAKING • PAINT & VARNISH • CHEMICAL
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AUTHENTICATED

CASE HISTORY

From the current files of Hoerner Boxes, Inc.

Re: Kewanee Manufacturing Co., Kewanee, Illinois

Packaging Costs cut 24%*

Every penny Kewanee Manufacturing Company saved through new packaging added to their profits. A clear-cut saving was made in the packaging of the company's steel door frames. A new improved package design by Hoerner did the job. It accounted for a 21% savings in actual material costs and the added savings in labor resulted in a total 24% cut in *overall* packaging costs. Well worth the call for a Hoerner Packaging Engineer.

**The Hoerner Packaging Engineer responsible: Mr. F. E. Calhoun*

HOW A HOERNER PACKAGING ENGINEER CAN HELP YOU!

If your company packages things, whatever they are, simply ask us to have a Hoerner Packaging Engineer come in and make an objective study of your packaging operations. It won't cost a cent, or obligate you in any way. It can mean an increased margin of profit through savings in labor and material costs and prevention of shipping losses. Just write to one of the Hoerner plants listed below.

SALES OFFICES: 209 S. LaSalle St., Chicago 4
50 E. 42nd St., New York 17

HOERNER BOXES, INC.

GENERAL OFFICE: 600 Morgan Street
Keokuk, Iowa

AFFILIATES—Keokuk, Des Moines and Ottumwa, Iowa
Sand Springs, Oklahoma; Minneapolis, Minnesota
Fort Worth, Texas; Sioux Falls, South Dakota
Fort Smith and Little Rock, Arkansas

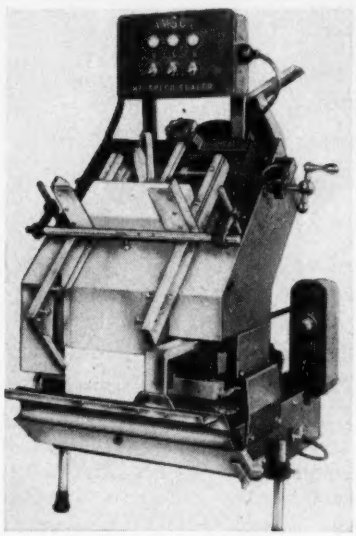
Packaging Engineers Designers and manufacturers of corrugated boxes.

aisles are narrow and space is at a premium.

Easy portability, fast action, operating simplicity, complete safety and all electric freedom from fire hazards are features claimed for new unit. It is available for operation on 220, 440, or 550 v. a.c. power. Operation of steam generator, regulation of detergent flow and atomization with steam at jet are all under finger-tip control of operator at steam gun or lance.

Utilizing steam pressures up to 200 psig. and without coils, tubes or heater elements to scale or burn out, the unit cleans and sterilizes safely, silently and without flooding working area.—*Livingstone Engineering Co., Worcester, Mass.*

Circle 1908 on Reader Service Card



Label Hopper Permits Quick Changeover

Addition of an improved label hopper permits rapid changeover to different width labels on this bag sealer.

Attachment which accommodates labels from 2½ to 8 in. in width operates by a simple handscrew adjustment which simultaneously centers label in relation to sealing jaws while readjusting width of hopper. As in earlier models, labels can be folded back-to-back or shorter back and longer front for a generous label design message.

Labelling and sealing are done in a single operation in sealer, which can be fed either manually or by conveyor. With filled bag in position, bag top and label are guided automatically between sealing jaws, while simultaneously another single label is picked from bottom of hopper by a vacuum

HOW CAN YOU BENEFIT FROM

RHOZYME

DIASTATIC ENZYMES?

If you make breakfast cereals, sweet syrups, grain neutral spirits, or other cereal-derived products, RHOZYME diastatic enzymes can offer you many processing advantages.

In the fermentation industry, for example, RHOZYME enzymes act as pre-malts and mash-converting materials. They permit savings up to 1c *per gallon* of industrial alcohol products.

In the manufacture of sweet syrups, RHOZYME diastatic enzymes hydrolyze starchy grains. Syrups thus made have a high concentration of fermentable sugars, do not readily crystallize, are free from bitter flavor.

Diastatic enzymes can help you lower production costs of breakfast cereals, too. Slight enzymatic hydrolysis of the cooking mash permits processing with a higher concentration of solids. Evaporation costs are thus lowered, higher production rates made possible.

These are just a few of the ways in which RHOZYMES enzymes help the food processing industry. Perhaps they can help your process too.

For complete information on RHOZYME diastatic enzymes, write Dept. SP.

RHOZYME *is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.*

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

For more information, use coupon on page 233.

Only
MOBILIFT
gives you Mobil-Matic Drive*
with HYDRA-LIZER*
in the NEW
3,000 lbs. at 24"
4,000 lbs. at 24"
FORK LIFT TRUCKS

Model Shown,
New M-324
with 83" Mast

More Operational and Service Features

- Easy to get on and off from either side.
- Spring mounted rear wheels for riding comfort.
- Combination ball bearing worm and nut type steering.
- One-piece hinged hood for easy access to engine compartment.

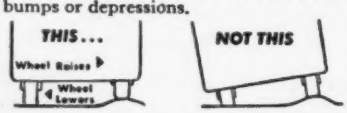
AND MANY OTHERS

*** MOBIL-MATIC DRIVE**

Fluid coupling, oil-immersed clutch, constant mesh transmission — a combination that transmits power smoothly and efficiently with minimum wear and service. There is NO CLUTCH PEDAL — just ONE push-pull forward and reverse lever!

*** HYDRA-LIZER**

Another Mobilift exclusive . . . equalizers mounted on each rear wheel and connected hydraulically to cross compensate the truck when the *front or rear* wheels pass over bumps or depressions.



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Equipment & Supplies

attachment. Danger of spillage is eliminated by having bags fed into machine in a vertical or near vertical position.

Other features reported for sealer are:

Unit can handle square, rectangular and die-cut labels; casein or thermoplastic stock. It seals cellophane, polyethylene, pliofilm and other heat sealable materials.—*Amsco Packaging Machinery, Inc., 31-31 48th Ave., Long Island City 1, N. Y.*

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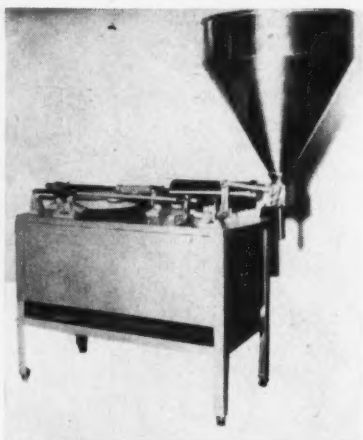


Fill Adjustments Feasible While Unit Is Running

A micrometer adjustment on this new automatic food filler permits the quantity of fill to be increased or decreased while machine is in operation.

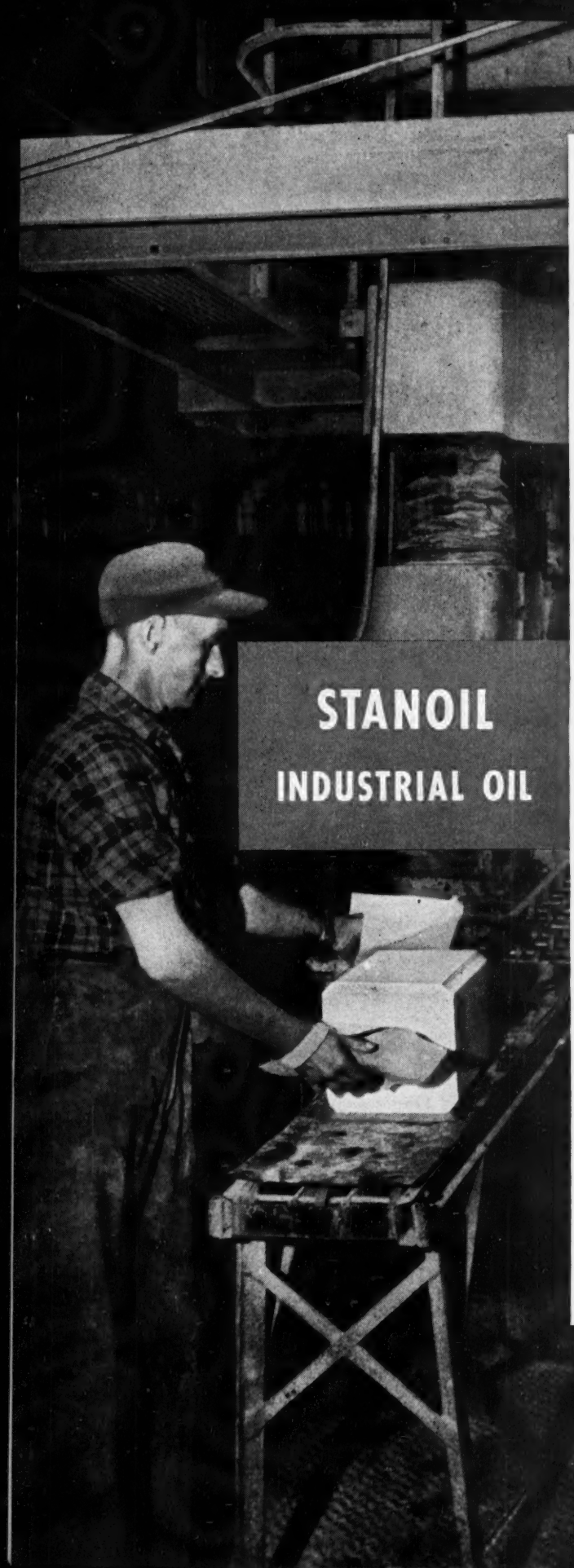
Filler can be stopped instantly even in the middle of a discharge stroke without turning off motor switch. Unit fills liquids or semi-solids at 10 to 30 containers per min. Unit is adjustable from gal. to 8 oz. and can be easily dismantled to clean. It has stainless or acid resistant nickel alloy contacts. An 8 ft. conveyor is optional.—*F. L. Burt Co., 571-7th St.., San Francisco.*

Circle 194A on Reader Service Card

New Chemicals

Insecticide KO's Flies, Harmless to Humans

Of interest to canners is a new insect control product. Its low toxicity renders it harmless to humans and warm blooded animals and thereby permits it to be used for both contact spraying and vaporizing around load-



How a good oil earns its salt!

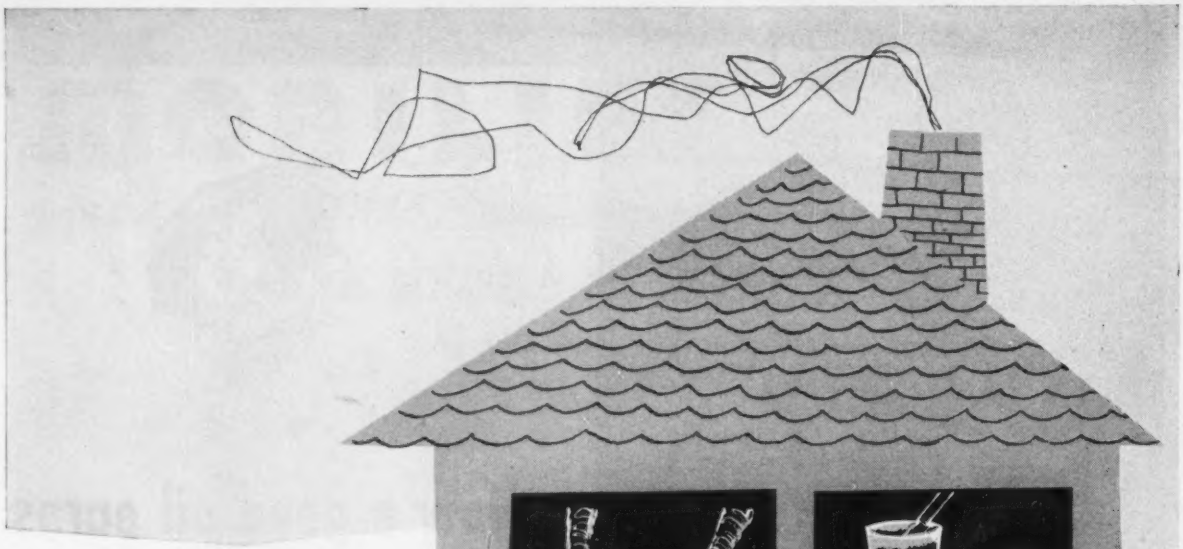
Here's a "salty" story about an oil with staying power. When this 100 ton hydraulic press was to be installed by the Morton Salt Company in their Manistee, Michigan plant, officials outlined to a Standard Oil lubrication specialist some of the rigid specifications the required oil should have. The new press would operate under a heavy load five days a week, and since the original fill would be large — 22 barrels — it was important that the oil installed resist oxidation and remain in good condition for long periods.

The Standard man recommended STANOIL Industrial Oil #25, a many-purpose oil having high stability and effective rust protection. In over seven years of hard service, the oil has never been changed! During this period, periodic tests of oil samples have shown that STANOIL, despite hard service and high oil-operating temperatures, has maintained a lubricating quality comparable *with a new oil.*

For information on how *you* can best use STANOIL in *your* plant, check with a specially trained and experienced Standard Oil lubrication specialist. He can help you save time and money. Call your nearest Standard office, or write to Standard Oil, Chicago.

STANDARD

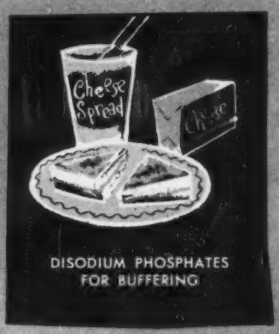
STANDARD OIL COMPANY
(Indiana)



HAD YOUR PHOSPHATES LATELY?

Of course you have! Take your morning toast or luncheon rolls, for example. Chances are they were made from flour enriched with calcium phosphate, with yeast cultivated with ammonium phosphate and with salt kept free-flowing by a trace of tricalcium phosphate. What's more, phosphates were in your sugar, condensed milk, process cheese and a score of other food favorites, including your soft drink.

If you manufacture or process food, you're probably familiar with the versatility of phosphates. Also, you're probably aware of Victor's outstanding leadership in phosphates. Victor's plant facilities, research staff and sales service organization are yours to use. The next time you have a product or process problem that a phosphate might solve, call on us. You'll find that *it pays* to see Victor.



VICTOR SERVES THE FOOD INDUSTRY

AMMONIUM PHOSPHATES—Manufacture of yeast, vinegar, yeast foods, pH control of soda crackers, bread improvers . . . CALCIUM PHOSPHATES—Mineral enrichment, leavening agents for self-rising flour, self-rising corn meal, pancake flour and prepared mixes; baking powder. To prevent caking of salt, soda, and sugar . . . IRON PHOSPHATES—Iron enrichment . . . PHOSPHORIC ACID—Manufacture of yeast, sugar, soft drinks, imitation jellies, gelatin . . . SODIUM ACID PYROPHOSPHATE—Baking acid in prepared mixes, doughnut flours, ingredient in baking powders.

VICTOR CHEMICAL WORKS, 141 WEST JACKSON BLVD., CHICAGO 4, ILL.

ing docks, in the plant, and on waste destined to become animal feed.

Product is a highly concentrated, emulsive insecticide formulated to control the common fruit fly, pomace fly, and vinegar fly around canneries. It contains a high proportion of pyrethrins and piperonyl butoxide with suitable emulsifiers in a petroleum base. Insecticide is supplied in concentrated form and is diluted at time of use.—*West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.*

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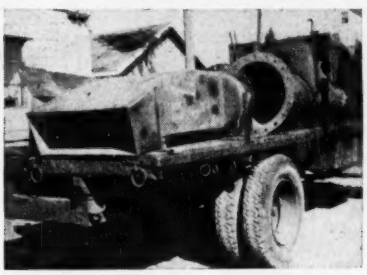


New Plastic Coatings Are Tough, Flexible

Protection against corrosion and abrasion is provided pipes, tanks, and ducts with use of a new plastic coating employing polyvinyl chloride as the basic ingredient.

Coatings are easy to apply by brush, spray gun or dipping. They dry to tough, flexible finishes that prevent abrasion and corrosion from shortening equipment life.

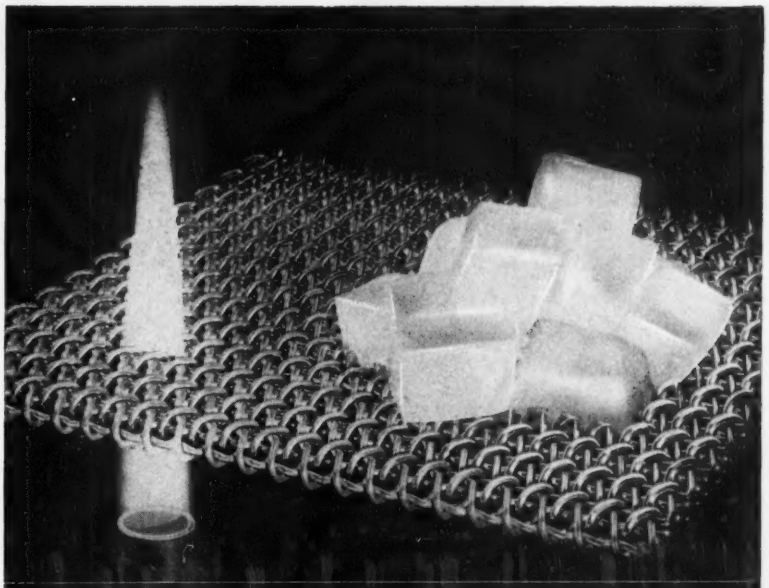
Ducts in illustration have been coated on interior, and are used to carry fumes of nitric acid, hydrofluoric acid and other highly corrosive chemicals. Coatings are reported to last for several years. Coatings are reported to withstand wide ranges of temperatures and thermal shock, and to be water-resistant, non-porous, non-flammable, odorless, tasteless. They are stated not to chip or crack on flexible surfaces, and are available in numerous colors—*Magic Chemical Co., 121 Crescent St., Brockton 2, Mass.*

Circle 197A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 233. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.



HEATPROOF! COLDPROOF!

proves Cambridge

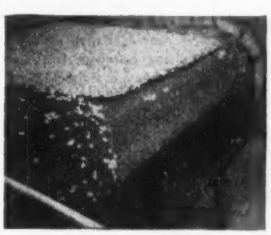
WIRE MESH CONVEYOR BELTS

best for food plants!

You can bake, fry or blanch—cool, chill or freeze—any type of food product right on the belt without fear of damaging the belt! The all-metal wire mesh belt is impervious to damage from heat or cold, moisture or other corrosive conditions!

That's just one reason why WIRE MESH conveyor belts are superior to solid types of belting for food processing. Open mesh allows free drainage of wash water or process solutions, free circulation of heat or cold during cooking or cooling. All-metal belt has no odors, thus cannot contaminate the natural flavor or aroma of your product. Stainless steel, widely used for food processing belts, further assures freedom from contamination by giving lifelong rust-protection. You can steam clean or wash your wire mesh belt as often as you like without damage.

No matter how you look at it, the best all-around conveyor belting for food plants is WIRE MESH . . . and the best wire mesh belts are made by Cambridge, pioneers in wire mesh belt fabrication. Cambridge belts are made in any size, mesh or weave and from any metal or alloy. Your Cambridge Field Engineer can recommend the best type for your plant. Look under "Belting-Mechanical" in your classified telephone book, or write direct for Cambridge man nearest you.



BEANS FREEZE very quickly, uniformly on this Cambridge wire mesh belt in a continuous freezing tunnel. Moving belt provides fast continuous production; open mesh allows free cold circulation for uniform freezing.

FREE REFERENCE BOOK illustrates and describes wire mesh belts, gives conveyor design information, specifications and metallurgical data. Write for your copy today.

The Cambridge Wire Cloth Company

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department Q
Cambridge 10, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

For more information, use coupon on page 233.

This may surprise you!

Many dollars may be saved in plant operating cost with the new Sparkler *large volume* diatomite water filter, Model SCJ.

If you are now operating with poor quality water, this filter, by removing all sand, algae, silt etc., will make a decided saving in the maintenance cost of pumps and compressors, and will increase the efficiency of heat transfer in boilers, cooling coils, etc.

Quenching water and other constant temperature water used in the plant can be re-used without heat loss by filtering in this new diatomite filter, which will operate efficiently with temperatures up to 180° F.

Spray tips retain their setting without clogging or undue wear. Washing operations are more efficient with sediment-free water.

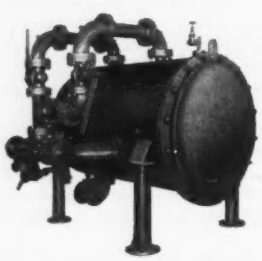
This new heavy duty filter will remove all silica sand, algae, silt, and other suspended matter either solid or colloidal, and reduce bacteria 80% to 100%, depending on the type of bacteria, from water sources such as lakes, rivers, or wells; thus requiring a minimum of chlorination to obtain crystal clear, safe water.

Diatomite filtration has in recent years, become the recognized standard procedure in general industrial filtering, and now, the large volume diatomite filter developed by Sparkler opens up a new phase in plant water supply and re-use water not possible with the small size diatomite filters formerly available. Single Model SCJ filter units up to 5,000,000 gallons per day are available.

★ Original installed cost is about 2/3 that of sand filters, and space occupied less than 1/2.
★ Much less water required to back-wash and clean as compared with sand filters, with attendant economy in water and labor.

If you have a plant water problem, Sparkler filtration engineers can help you. **Write Mr. Dan Baldwin for estimates and engineering service.**

Model SCJ diatomite water filter. Available in capacities up to 5,000,000 gal. per day in a single unit. Multiple units engineered for larger requirements.



Waste water, returned to streams can be cleaned up to meet legal requirements with the Sparkler Model MCR filter with dry disposal of filter cake and residue. A very economical and efficient method of handling the plant effluent water problem.

SPARKLER MANUFACTURING CO.

MUNDELEIN, ILLINOIS • *Canadian Plant*, Galt, Ontario

European Plant, Amsterdam, Holland

For over a quarter of a century, engineers and manufacturers of a complete line of industrial filtration equipment.

Equipment & Supplies

Low-Toxicity Solvent For Machine Cleaning

Wax, oil and grease are readily removed from food machinery with use of a new low-toxicity solvent. Called Vythene-C, it is less than 1/20th as toxic as carbon tetrachloride, yet fast evaporating and has no flash point or fire point. It contains a very small percentage of non-volatile material and leaves no residual odor.

Material shows excellent stability for all metals including aluminum, brass and copper, even at boiling point of solvent. Non-corrosive to brass and copper and practically inert to ordinary electrical insulating varnishes and materials, it may be used for such diverse operations as cleaning of electric motors and electrical equipment. Material is principally composed of stabilized 1,1,1-trichloroethane.—*Tect, Inc., Dumont, N. J.*

Circle 198A on Reader Service Card

Non-Warp Animal Glue Has Long Tacky Stage

Easy and economical usage through increased mileage, prompt melt-down from 5 lb. cakes, and an extended tacky stage are advantages claimed for a new non-warp flexible animal glue. Named Econoflex, it is recommended for use on paper specialities, set-up boxes and as an adhesive for paper covering and liners.

Designed for hand application or for loose or tight-wrap operation on semi-automatic or automatic machines, material provides a quick strong tack that will remain workable over long periods. Properties of low viscosity combined with high solids content provide ease of machining, quick melt-down and smooth transfer of film.—*Swift & Co., Union Stockyards, Chicago.*

Circle 198B on Reader Service Card

OTHER DEPARTMENTS

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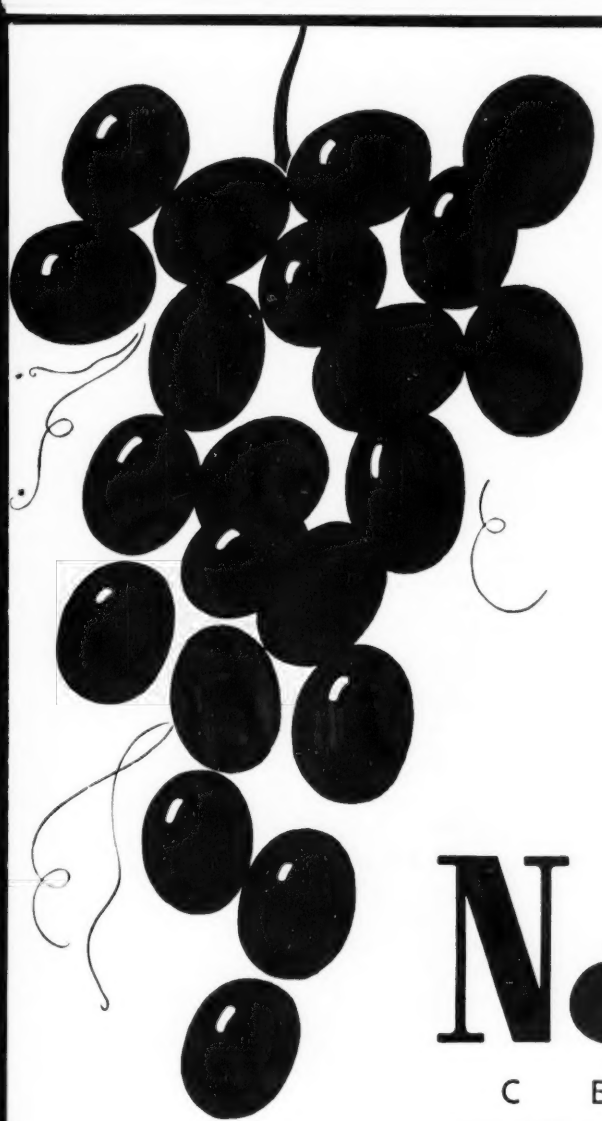


"They taste first with their eyes"

National

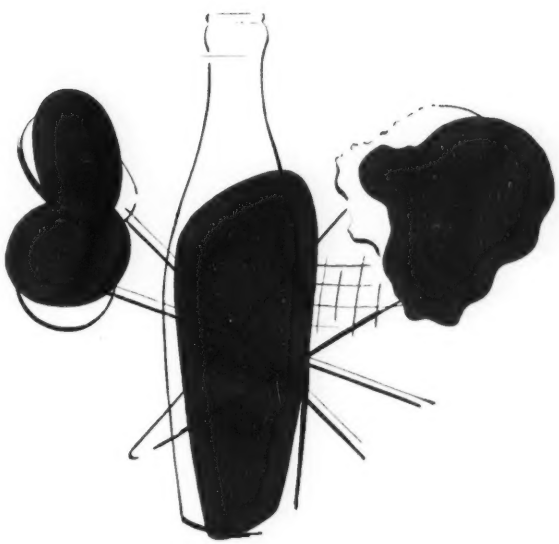
CERTIFIED

FOOD COLORS

Sight and taste are complementary senses, as every psychologist knows. In other words, "What looks good, tastes good."

Our business is helping manufacturers to add the tinge of color that emphasizes the goodness of wholesome foods and beverages. Our Certified Colors are produced from basic raw materials wholly within our Buffalo plant by men who understand and respect your insistence upon purity. For over 50 years National Food Colors have set the industry's standard for uniformity of shade, pure-dye strength and composition.

Since the finest food colors cost so little, why not standardize on National Food Colors?



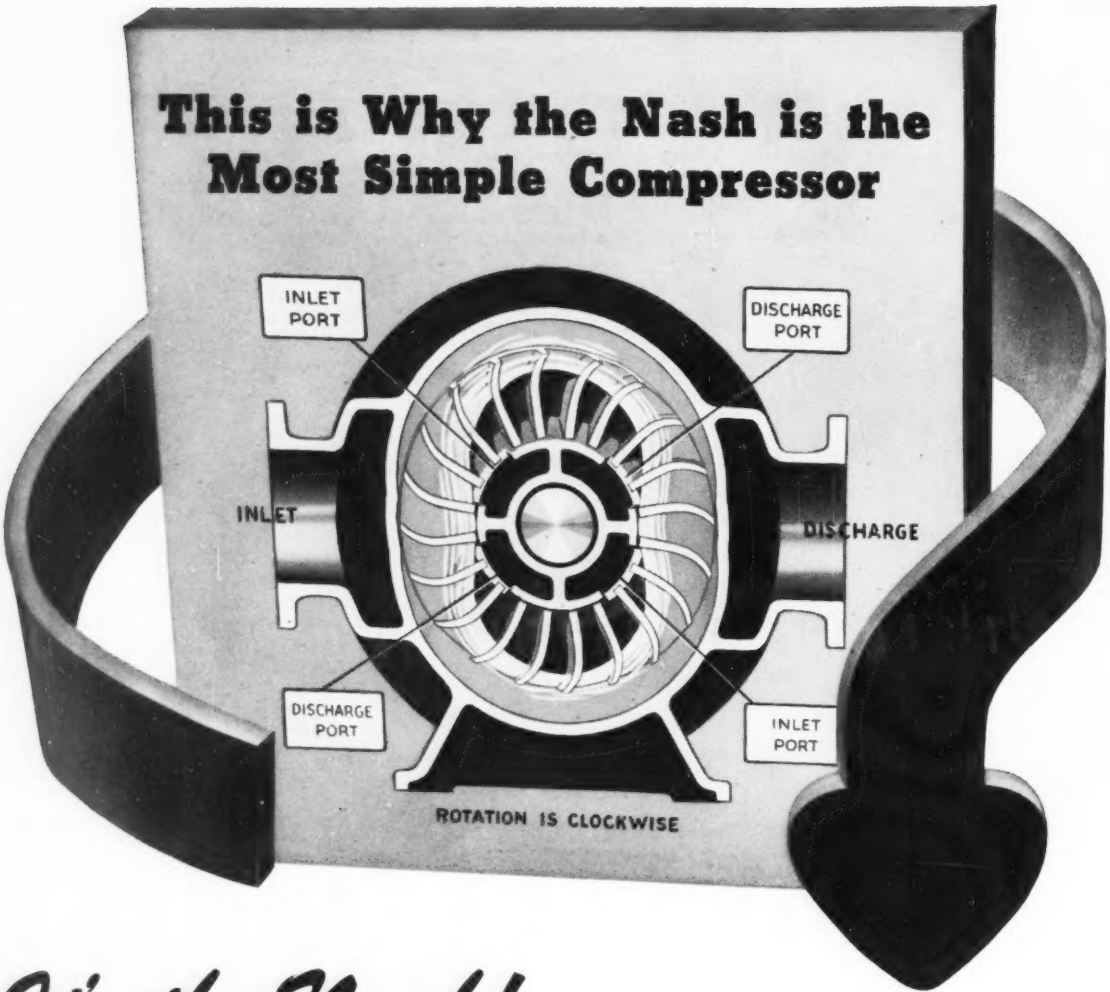
CERTIFIED COLOR DIVISION

NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION • 40 RECTOR ST., NEW YORK 6, N. Y.

Boston Charlotte Chicago Philadelphia Portland, Ore. San Francisco Toronto

Allied Chemical

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

313 WILSON, SO. NORWALK, CONN.

Plant Fire Department

—*Continued from page 53*

the city fire department can hook up their hoses in event we ever run short.

Guesswork was taken out of the task of using these facilities for fire fighting. A simplified plan was drawn to locate the apparatus. Fire extinguishers and hoses were installed on the right-hand side of doors. Now, regardless of how much smoke there is in a building, a fireman has no difficulty in finding them.

Five Points of Organization

As for the crew, 18 firemen are assigned to the day shift and 9 each to the other two. Heading the department is the fire chief, with two assistant chiefs (superintendents of yards and garage) on day shift, and two captains, one in charge of each of the other shifts. On each shift are two fire-engine operators and the rest firemen. Five plant guards have also been taught to handle equipment.

Firemen have been picked from yard workers and those employed on ground floors. Selected, for example, are electricians, steam fitters, garagemen, etc.

The fire brigade is constantly drilled, to keep it in first-class shape. Also drilling with the fire crew are 56 plant guards. Drills are held twice monthly for each shift.

These exercises involve connecting hoses to pumps and fire hydrants; pumping water from fire hydrants, 1,000-gal. tank wagon, or 100,000-gal. reservoir; checking and using fire extinguishers and gas masks; and raising ladders. Moreover, the men are given question tests pertaining to fire prevention and fighting.

Surprise drills often are held to keep the firemen on their toes. For example, arrival at a purposely-kindled wood fire, started some 3½ blocks from the fire house, took the crew only 2 min.

Chief-and-Helper Team

Looking over plants daily for fire hazards is the duty of the fire chief. His checkups are carried out with the aid of a helper. While one is making an inspection, the other remains on the ground floor so that they won't be caught short in event of a fire. Any fire hazards observed during an inspection are brought to the attention of the department head for immediate correction. These inspections have materially aided in improving plant housekeeping.

When you have a fire department,

Quickly set—holds temperature constant

Here's a proved way to modernize and *save* on your processing operations. With this dependable Sylphon Regulator, you can make quick changes in temperatures for liquids, air or gases. Simple turn of the crank adjusts the temperature to the setting desired. Ideal for applications requiring frequent temperature changes to suit processing stages.

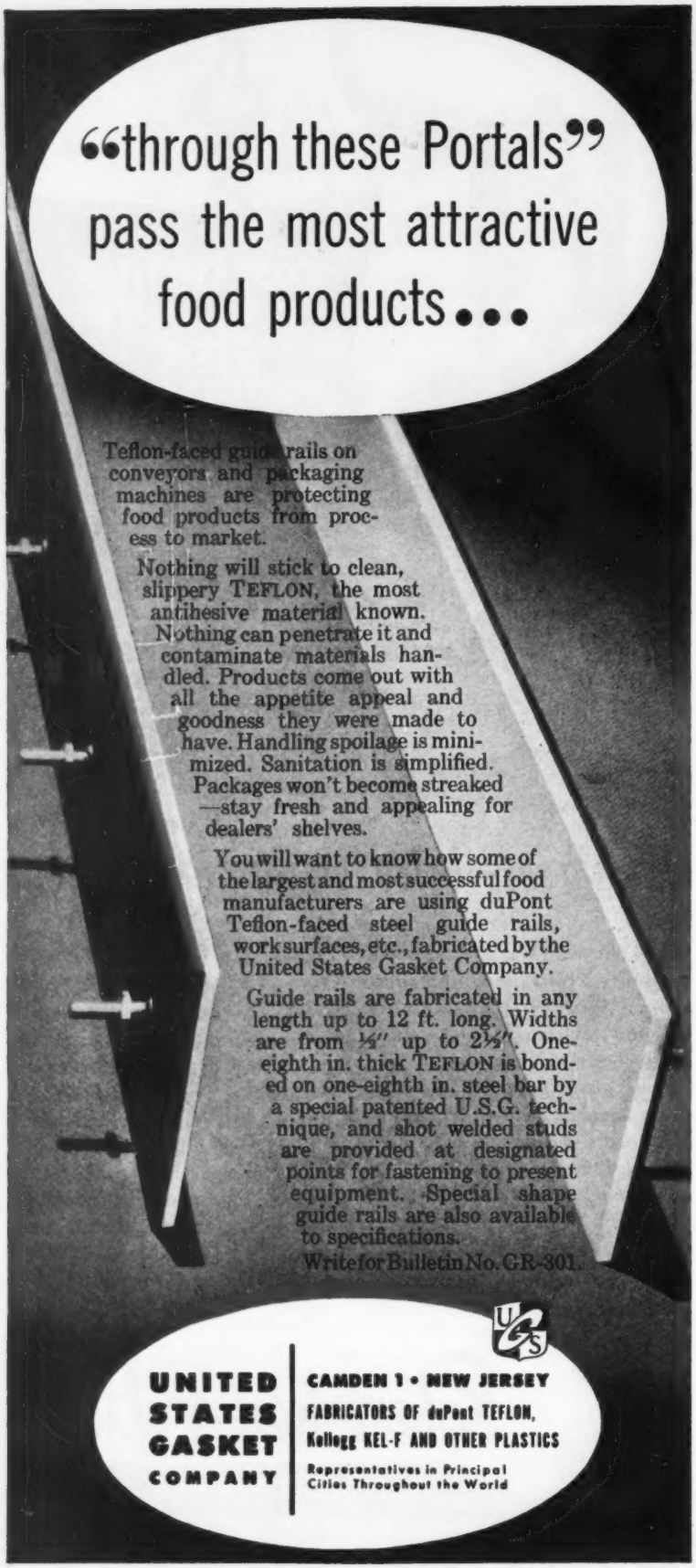
More advantages! You are assured of uniform processing conditions. Spoilage is reduced. Wasteful overheating is prevented. You save manpower, man hours and fuel.

Sylphon Regulator No. 923-Q has many uses: with open and closed tanks, bottle washers, glue kettles, dishwashing machines, slashers and other units. Sturdily built for years of trouble-free service. Recommended as standard equipment. Write for information. Or, ask about a Sylphon Control for *your* specific operations. Send for Catalog TG-D

Robertshaw-Fulton CONTROLS COMPANY

FULTON SYLPHON DIVISION • KNOXVILLE 1, TENN.

For more information, use coupon on page 233.


"through these Portals" pass the most attractive food products...
Teflon-faced guide rails on conveyors and packaging machines are protecting food products from process to market.
Nothing will stick to clean, slippery TEFLON, the most antihesive material known. Nothing can penetrate it and contaminate materials handled. Products come out with all the appetite appeal and goodness they were made to have. Handling spoilage is minimized. Sanitation is simplified. Packages won't become streaked —stay fresh and appealing for dealers' shelves.
You will want to know how some of the largest and most successful food manufacturers are using duPont Teflon-faced steel guide rails, work surfaces, etc., fabricated by the United States Gasket Company.
Guide rails are fabricated in any length up to 12 ft. long. Widths are from ½" up to 2½". One-eighth in. thick TEFLON is bonded on one-eighth in. steel bar by a special patented U.S.G. technique, and shot welded studs are provided at designated points for fastening to present equipment. Special shape guide rails are also available to specifications.
Write for Bulletin No. GR-301.
UNITED STATES GASKET COMPANY
CAMDEN 1 • NEW JERSEY
FABRICATORS OF duPont TEFLON, Kellogg KEL-F AND OTHER PLASTICS
Representatives in Principal Cities Throughout the World

you should have a firehouse. So we converted an old grainery (14x60 ft.) into one, putting in tile walls and floor. The two-story facility houses the spanking new fire truck and such equipment as oxygen masks (45-min. demand type, self-contained) and an MSA Pneolator (artificial respiration equipment).

On the second floor are quarters for the plant guards. Some of the guards, as stated, help the fire-fighting crew, training with it. Then, of course, principal fire-fighting task of these men is directing traffic in event of fires.

Fire calls formerly came into a control desk, where a guard gave out a whistle signal—so many blasts for a specific building. Now, however, a 5-hp. siren, strategically located on the West Bottle House roof, signals fire alarms.

The new brewery fire truck is the latest addition. This 3-ton, 145-hp. Ford truck is equipped with a 500-gal.-per-min. centrifugal pump (pressure of 100 psi.) on front end, with 4-in. hose for suction end and 2½-inchers for the two discharge ends. For flexibility, there are two suction hoses—20-ft. of hard-suction, non-collapsible hose for pulling water out of the 100,000-gal. reservoir and a 30-ft. soft-suction hose for hook-up to fire hydrant.

Other truck equipment includes a high-pressure, piston-driven pump; 600 ft. of high-pressure 1-in. hose; 150 ft. of 1½-in. hose; and 1,000 ft. of 2½-in. hose.

Also there is a special ⅜-in. nozzle (Akron Brass Mfg. Co.), which when hooked up to water line operating under a pressure of 100 psi. simultaneously throws an 8-ft.-dia. spray umbrella (for protection of firemen in very hot areas) and shoots a ⅜-in. stream of water three stories high.

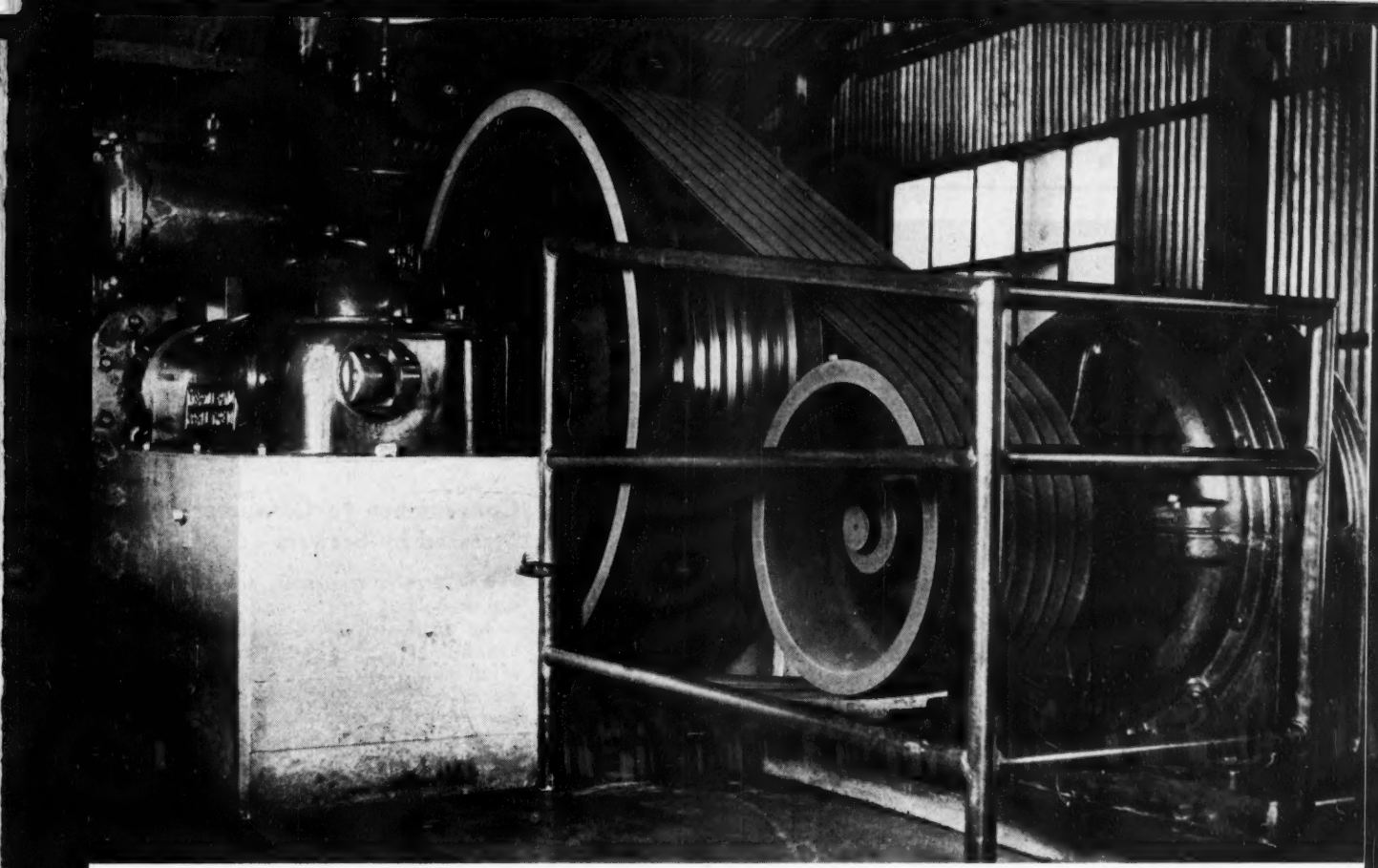
Further included are six fire extinguishers—two water pumps, two CO_2, one carbon "tet", and one dry chemical.

As for lights, there are two rear spotlights (200-yd. beam), a red beacon ray visible for one mile, a 10-in. floodlight that covers a 12-story building, tail light operated from cab, and two portable spotlights.

There are also a siren, overhauling rake, oxygen mask, crowbar, fire axes, and three aluminum ladders (12-ft. folding, 24-ft. extension, and 35-ft. extension).

In addition to the fire truck, there is a 1,000-gal. street-flusher with a 500-gal.-per-min. centrifugal pump operated from the 3-ton truck's engine. Street-flusher travels with the fire truck during fires, and it is used as a source of water.

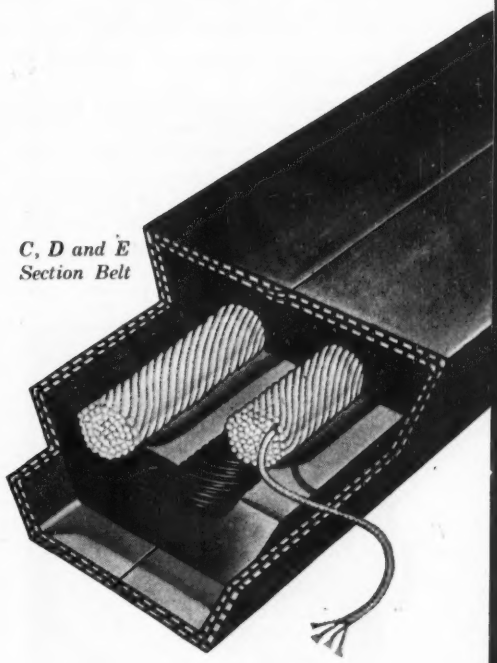
End (*Resume reading on page 54*)



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every plant application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of any plant service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



C, D and E Section Belt

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

NEW PACKAGES & PRODUCTS

Cookie Mix, Variety Pack, Aid Housewives

Directed at making every housewife a first-rate baker, General Mills' Betty Crocker line of mixes has been increased by two: a chocolate fudge brownie mix and a marble cake mix.

Usually a lengthy business, the baking of brownies is cut to a simple "stir it and put it in the oven" process. The housewife need add only water, eggs, and nuts to the mix before placing it in the oven.

Feature of the marble cake mix is the fact that only one bowl need be used, where formerly two was a minimum. The package contains a packet of the yellow mix, and an envelope of chocolate marble mix. The chocolate is added to the yellow batter.

Both mixes are packaged in 20-oz. boxes. Planned for September release is a homogenized pie crust mix in stick form.

Still another boon to the housewife is a cereal package designed to satisfy the youngster with varied taste in breakfast cereals. Called the "Pick-A-Pack," a bright yellow paperboard carton holds ten packages of assorted cereals. Three packages of Cheerios, three of Wheaties, two of Jets, and two of Kix. All are wrapped in cellophane, except the Jets, which are packed in aluminum foil. Prominent on the carton is the recently adopted trademark of Betty Crocker, a red spoon.

New Coffee Grind

Directed at compiling the three standard grinds—percolator, drip, and vacuum—a new all-method grind has been introduced by Chock Full o' Nuts, New York coffee processor. Packed in a bright, 1-lb. vacuum tin, the new grind will replace the company's three standard grinds.

A unique feature of the coffee is the plastic coffee measure included in every can. This measure, leveled off, holds the exact amount of coffee to be added to every 8-oz. of water.

The label for the can has been completely redesigned. Of bright yellow, black, green, and red, it features the all-purpose grind advantage. A circular label on the lid offers directions on preparation of the coffee in all types of coffee makers.

Orange Juice Carton

Adaptation at American Can Co. of a milk carton for whole orange juice packaging is reported. Now used by two Florida processors (Golden Gift Co. and Fruit Industries, Inc.), the containers are understood to be constructed of heavier stock than the milk cartons, but have a similar appearance.

Acceptance of the fiber container is the result of extensive research and testing by the can company's laboratories.

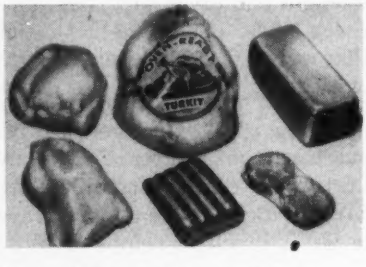
For Package Data Use Reader Service Card

Convenience to Consumer Stressed by Brewers

An "economy quartet", a sleeve carton holding four 16-oz. cans, is being distributed by Blatz Brewing Co., Milwaukee. The pack, containing a full half gallon of beer, utilizes the recently introduced jumbo cans of beer. Labeling on the 16-oz. cans is the same as that on the 12-oz. cans except for a wider border at the top. The sleeve carton is printed in four colors and points up the larger size of the cans. Tabs at the end are automatically folded inward to hold the cans in the sleeve.

Piel's has added a no-return quart to their packaging line. Similar in appearance to the company's deposit quart bottle, the new bottle is somewhat taller because of a longer tapered neck.

Acceptance of the disposable bottle was prompted by consumer demand for the 12-oz. throw-away bottle used by the brewer. Now in use by the company are a 32-oz. deposit bottle, 12-oz. can, 12-oz. deposit steinie, 12-oz. one-way steinie, and the 12-oz. export bottle.



New Shrinkable Poly

Shrinkable polyethylene bags are being manufactured by Central States Paper and Bag Co., St. Louis, under the trade name "Poly-Skin". Made of a Visking material which shrinks 30% in both directions, the bags are ideal for packaging meat and poultry.

After air is removed with conven-

PROTECTED BY RIEGEL

CEREALS

Ranger Joe Rice Honnies use special Riegel foil-and-glassine laminated liner

CAKE MIXES

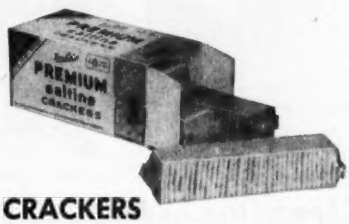
Pillsbury Angel Food cake mix contains 2 packages: Egg-white mix in glassine-foil laminant, heat-seal poly-coated; Flour mix in poly-coated special glassine; both printed

CANDY AND GUM

Riegel's 2-ply gum wrap . . . high-gloss-coated, gravure printed and laminated to aluminum foil by Riegel . . . is used by leading brands of gum

DRUGS AND COSMETICS

Marchand's Hair Rinse is a powder that needs extremely high moisture protection . . . uses special Riegel Glassine, heat-seal coated with compound containing natural rubber



CRACKERS

Butyl rubber added to coating of special Riegel waxed glassine gives extra-tight seal, increases moisture protection, keeps Premium Saltines crisp longer

SUGAR

Domino "Stay-Soft" packages use liner of specially developed Riegel glassine to keep brown sugar moist and soft. Liner refolds neatly and easily

SOUP

Lipton soups use Riegel's Pouch Pak . . . a laminant of poly-coated pouch paper (outside) and foil (inside). High-gloss-coated, printed and laminated by Riegel

SOAP

Inner wraps of special Riegel glassines are used on many fine toilet soaps to retain delicate aromas

ICE CREAM

New design for Borden's famous Elsie Brand ice cream roll is gravure-printed by Riegel on specially treated paper having low liquid penetration and quick release

These are just a few of the many fields in which more than 600 Riegel papers are now proving their value for the nation's best selling brands. What is right for one product is seldom right for another, but Riegel can usually tailor-make the right paper for you . . . quickly, efficiently, economically. Just tell us what you want paper to do for you. Write Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.

Riegel Tailor-Made Packaging Papers
Glassines and Greaseproofs
Plain • Waxed • Printed
Lacquer-Coated • Laminated

What RIEGEL paper can do for you . . .

- Keep Products Dry
- Keep Products Moist
- Retard Rancidity
- Seal With Heat or Glue
- Provide Wet Strength
- Stop Grease Penetration
- Retain Aromas, Flavors
- Resist Extreme Cold
- Reduce Breakage
- Prevent Sifting
- Protect From Light
- Resist Alkalis
- Boost Machine Efficiency

For more information, use coupon on page 233.

AN EXPLANATION

In answer to increased interest in a recently inaugurated procedure for conducting "on-the-spot" demonstrations of air-flotation equipment, we are pleased to make the following explanation.

The advent of our lab-size Whippet V-80 Separator makes it possible to establish, in your own plant and at your convenience, accurate forecasts of results which will be obtained from the identical process under full-scale operating conditions.

Such a demonstration may be of invaluable aid to that phase of your research program which involves the economy of operations and the quality of raw or end products. Perhaps the V-80 will indicate an immediate usefulness. Seeing is believing.

Your move is simple. Write to the department and address below. Tell us that you want to see the results of separations made by effecting differences in specific gravity through air-flotation . . . under *your* actual operating conditions, rather than in a catalog. We'll take it from there.

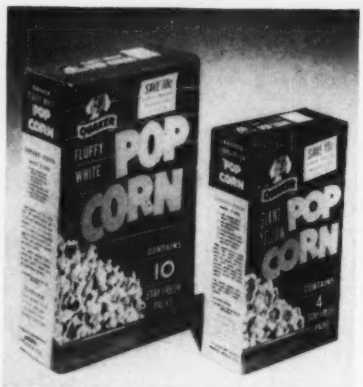
Dept. F-1054

SUTTON, STEELE & STEELE, INC.
1031 SOUTH HASKELL, DALLAS, TEXAS

tional vacuum equipment, the bag is twisted and the top clamped shut. It is then dipped for three seconds in a 215° solution containing propylene glycol, which raises the temperature of the water sufficiently to get full, rapid shrinkage. The package is then iced or frozen.

The bags will not tear or discolor, resist temperatures as low as −70°, take printing, and are inexpensive.

For Package Data Use Reader Service Card



Specialties Added

Quaker Oats Co. has added three specialty items to their familiar line of cereal products.

Corn for popping is being packed in two sizes and styles. Yellow and white corn is available in either 8- or 20-oz. boxes. The smaller box holds four 2-oz. double-sealed packets of corn. The large box holds 10 packets. Each packet holds enough corn for one batch. The corn is packed dry, the oil being added by the consumer.

A new and intriguing addition to the frozen food field is Quaker Oats Co.'s frozen pancakes. A 6-oz. package contains four "pre-baked" pancakes. The product is being marketed under the Aunt Jemima label. Instructions advise the consumer not to thaw the pancakes, and to heat them in an electric toaster.

Samples of tortilla flour are being distributed in the Southwest by Quaker as a bid for potential customers. The samples are packed in 4-oz. polyethylene bags.

Another Coffee Extender

Second imported "coffee extender" to be marketed in U. S. is "Diller Extender", processed by a German company, and distributed through Lantheaume, Inc., a San Francisco importer.

A vegetable product containing neither coffee or chicory, it makes it possible to brew a cup of coffee with only a teaspoonful of grounds. The importer is backing up claims with a guarantee of a price refund, plus a pound of fresh coffee, for any dissatisfied customers.

Fresh from the Oven

Hot spiced cinnamon rolls in 12-15 minutes, is the feature of Pillsbury Mills, Inc.'s canned Quick Cinnamon Rolls. Eight of the rolls are packed in a cardboard can with metal ends.

The housewife need only open the can, slide out the rolls, and place them in a 375° oven until brown. The rolls may then be served as is or frosted.

Label design follows the trend toward horizontal reading, convenient when the product is to be stored in a refrigerated display cabinet.

Also being tested by Pillsbury are three cookie mixes: chocolate chip, peanut, and yellow.

Ready-to-Eat Meat

Fully cooked and ready to eat smoked beef tongues are being processed by Swift & Co. Trimmed of excess fat, completely skinned and boned, the whole tongue is packed in a Cry-O-Vac vacuum package. They range in weight from 1½ to 2½ pounds, and may be served hot or cold. One pound of the tongue yields approximately the same lean meat as two pounds of uncooked, untrimmed tongue.

New Instant Milk

A 9¾-oz. jar of nonfat dry milk solids that will make three quarts of liquid milk is being marketed by Pet Milk Co., St. Louis. Reported to mix instantly, with no shaking, the product averages one cup to a quart of milk. It contains 36.5% protein, 51.5% lactose, 8% mineral, 1% fat, and 3% moisture.

Light and fluffy, the milk is packed in a wide-mouthed Duraglas jar. A waxed paper seal inside the screw cap offers added protection. Label is blue, white, and yellow, with the "instant" feature prominently displayed.

Package Size Changed

Better balance and appearance has been accomplished by Peter Paul, Inc., Philadelphia, for their "Walnettos", through adoption of a smaller caramel size. Twelve of the smaller caramels are now placed in a boat package instead of the 10 large caramels formerly packed. The result is a longer and narrower package, with stronger sales appeal. Above are a flat package adopted in 1949, the old package, and the present package.

Day after Day...

more and more nationally famous products are packaged on the

Automatic CAMPBELL WRAPPER

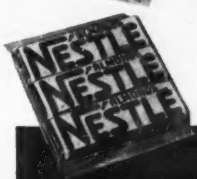
WRAPS ALL SHAPES — Square, round, oval, oblong, flat or irregular . . . the Campbell Wrapper packages them all with equal ease and speed.

WRAPS WITHOUT BREAKAGE — Soft, crisp, hard, or fragile, the Campbell Wrapper "float" wraps the material on your product without damage.

WRAPS WITH ALL MATERIALS — Paper, cellophane, polyethylene, foils and all types of the plastic film packaging wraps so popular today.

POSITIVE SEALING — By gluing, crimping or heat sealing with ends flared, turned under or diamond folded. The Campbell Wrapper is now also available for positive VACUUM Wrapping.

AUTOMATIC FEEDS — and deliveries provide continuous flow packaging geared to coincide with in-line production manufacture or separate operation. Write for complete details and send us a sample of your product.



Speeds Production
. . . wraps up to 300 units per minute!

Cuts Labor Costs
. . . simplified one person operation!

Saves Materials
. . . uses no boards or stiffeners— unless desired!

Campbell
WRAPPER
HUDSON-SHARP MACHINE CO. / GREEN BAY, WIS.
Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.

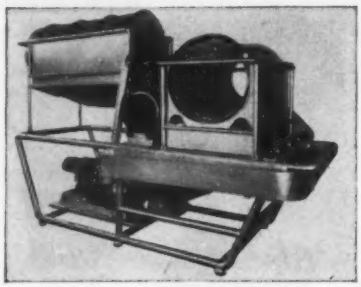
Write for full colored 16-page brochure telling all about the Campbell Wrappers and the many different types of products they package.

For more information, use coupon on page 233.

RENNEBURG

Wonder Line

Food Processing Equipment



Roto-Flo Washer

Continuous Washer for corn, limas, peas and similar products. Three washes with two water changes turn out a cleaner, brighter and better product. *Write for Bulletin 953-FE.*

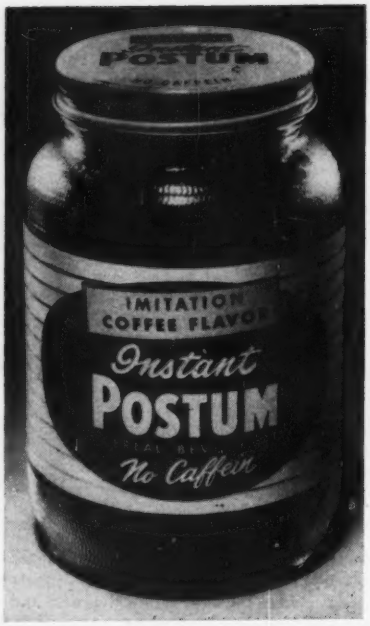
Cooker and Cooler

Fast cooking and cooling of canned products. Even production flow . . . accurate cooking temperature . . . cans continually rotated with 100% exposure of all surfaces for quick heat transfer. *Write for Bulletin 850-FE.*

Consult the Renneburg Engineers on all your Food Processing problems. Pioneers in Food Processing Equipment for over 80 years . . . ***Known the World Over.***

EDW. RENNEBURG & SONS CO.

Baltimore 24, Maryland, U.S.A.



Coffee-Flavored Beverage

A coffee-flavored Instant Postum is being processed by Post Cereals Div., General Foods, in 4- and 8-oz. jars. A soluble powder similar in appearance to instant coffee, the product is prepared the same way.

Using an artificial coffee flavor, the beverage is priced lower than instant coffee. Labels are colorful foil with the brand name printed in white on a red background.

The new product will be offered in addition to the regular Postum.

Frozen Grapefruit

Markets tests of frozen grapefruit sections are being carried out by the Florida Citrus Commission. Processed by Minute Maid and Pasco Packing Co., Florida, the citrus product is comparatively new and was introduced with little fanfare.

The quick frozen fruit is ideal for breakfast fruit, salads, short cake, and fruit cocktail. It is kept frozen until served.

In the Pasco product, a blue and white foil label is used. Markings on the label indicate that sugar is added.

Convenient Cereal Carton

A unique carton that saves time and reduces damage to contents during unpacking, is being used by Gerber's Baby Foods for national shipment of its cereal "Quads".

In unpacking, a tear-pull at the center perimeter of the case effortlessly divides it into two opened halves of twelve packages each. This eliminates the need for case cutter or knife, reducing damage to the contents.

When opened, all 24 package tops are exposed for price-stamping. This speeds unpacking and shelf-stacking. Printing on the carton appears both right-side-up and inverted on all sides of the case, so that the halves are readily identified.

Prepared Turkey

The 1955 Thanksgiving turkey is playing along with the trend among processors to ease the housewife's work burden. Birds prepared by Swift & Co. now are not only completely cleaned and ready to stuff, but do not have to be shaped or trussed with thread or skewers. Now the drumsticks are tucked through a slit cut in the loose skin below the tip of the breastbone, holding the legs firmly against the body and over the body cavity.

Hallowe'en Packaging

A Hallowe'en candy unit designed and made by Angelus Paper Box Co., Los Angeles, resembles a crouching black cat. Formed of a simple cut and creased blank, printed orange and black on white, the cat holds a 6-oz. bag of candy. The bag is also printed with cat faces. The carton is presently being used by Bishop & Co., Inc., Los Angeles candy processor.

Chunky Chocolate Corp.'s milk chocolate cartons will be overwrapped with a cellophane wrap designed by Milprint, Inc., New York. The wrap is printed with orange jack-o-lanterns, cats, witches, owls, and masks.

For Package Data Use Reader Service Card

Potatoes in Poly

Vicking Corp.'s plastics division has reported that polyethylene bags will be used to package potatoes during the coming season. Tests in Maine and Ohio were regarded as successful, when sales of the poly'-packed potatoes outstripped those of spuds packed in mesh bags.

Most popular size is the 10-lb. bag, using 11x20 in. of .0025-in thickness.

For Package Data Use Reader Service Card

New Product Shorts

Sherbet Gets Foil Wrap

Junket sherbert mixes will soon debut with an aluminum foil wrapper designed by Jim Nash, and made by Reynolds Metals Co.

Distributes Instant Milk

An instant dried milk product developed by Western Condensing Co., San Francisco, will be distributed by Carnation Co. under the Carnation label (feature article, p. 74).

New Ice Cream Flavor

Mango has been added to the ice cream flavors processed by Dressel's Dairy, Miami.

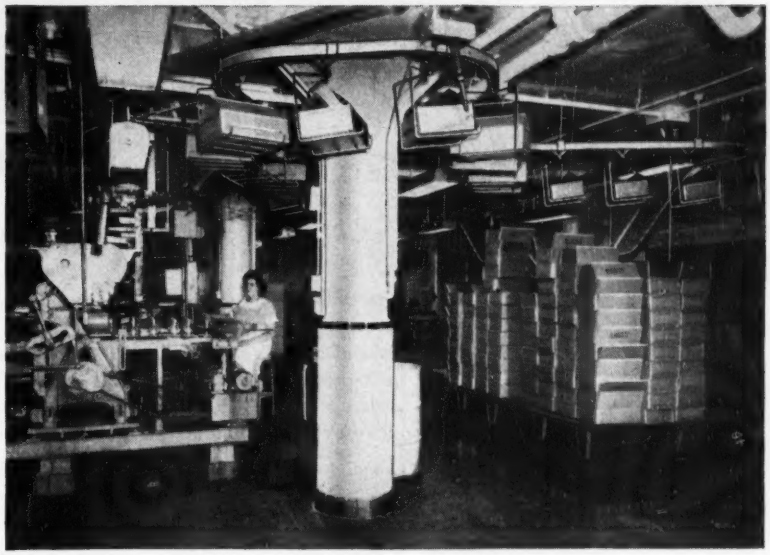
Still More Canned Pop

Latest processors to market pop in flat-top cans is Cliquot Club Co., Millis, Mass., and Miller-Becker Co., Cleveland.

Cheese in Foil

A foil-wrapped 4-oz. package of Miss Wisconsin Blue Cheese is being marketed by Armour and Company. Armour has also added a breaded veal grill steak to its line.

No "jam" on this line...



R-W "ZIG-ZAG" Conveyor serving the preserves line of the First National Stores, Inc., Somerville, Mass.

R-W "Zig-Zag®" Continuous Power Conveyor

removes production bottlenecks

The First National Stores, Inc., Somerville, Mass., solved their handling problems on the preserves line with a Richards-Wilcox "ZIG-ZAG" Conveyor System. Zig-Zag takes handling overhead, keeps production moving efficiently and continuously, releases valuable space and personnel for other uses.

R-W ZIG-ZAG Conveyors are quality manufactured to guarantee you many long years of the utmost satisfaction in performance. Their amazing versatility makes them adaptable to almost any plant conditions—they move up, down, in, out and around—just like water through a pipe. Standard 6-inch carrier pendant centers make Zig-Zag easily adaptable to changing production needs.

ZIG-ZAG Conveyors may be relocated or extended by plant personnel, usually using all the original parts. They save on maintenance costs and help lower production costs through increased efficiency.

ZIG-ZAG Conveyors are designed to take your handling problems out of your hands. For complete information consult with your nearest R-W Engineering Office—no obligation, of course.

1880 RICHARDS WILCOX R&W AURORA 1954

Reg. U. S. Pat. Off.

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS •

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MATERIALS HANDLING DIVISION

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For more information, use coupon on page 233.

BACK IN THE 1880's

IN THE DAYS OF

JESSE JAMES

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

Even at the time Jesse James' spectacular career was making news, KOVEN was already speeding up production in the food industry. Today, more than ever, leading food plants depend on KOVEN Individualized Equipment—built to their exact requirements—for peak production at greatest efficiency. See for yourself how KOVEN's expert techniques and vast facilities can save you money while they solve your production problems. Call or write for a consultation—no obligation. Send for Facilities Catalog #490.

Complete modern facilities including X-ray inspection and stress relieving which insures quality control. KOVEN equipment in all commercial metals and alloys include: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, breechings, coils. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

mixing

angular mixing tanks
de of steel

Heavy pressure surge tank

PLANTS:

Jersey City, N. J.

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L. O. KOVEN & BRO., INC.
154-D Ogden Ave., Jersey City 7, N. J.

KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

Preventive Lubing

—Continued from page 49

serving the 33 extraction machines.

The conveyors are identical in construction features. Frames are of stainless steel, and rubber belts run over stainless steel rollers with a bearing on each end. There are upwards of 3,000 bearings on the 450-ft. of conveying and washing and grading equipment, and there are nine admitting valves in the system.

One man wheeling a portable electric pump consecutively to each of the nine stations and hooking it up, can lubricate all the bearings within one hour.

The pressure system is built up to 2,700 psi., and pressure is released to permit subsequent, measured shots of lubricant to be discharged from the valves into each bearing. Because distribution is totally enclosed, it is, in effect, "a barrel to bearing" system, thereby protecting against any contamination of the lubricant.

Also, since valve sizes are selected for each specific job, the amount of lubricant dispensed is always uniform according to quantity needed. Oil waste and spillage is thus eliminated —a very important benefit in saving lubricant and assuring proper lubrication.

In addition, the sanitation problem is lessened—there being no excess lube to drip on the conveying equipment and the floors, to contaminate the fruit, or, possibly, to create a safety hazard.

What would have been a full time job of manually lubricating the entire system of so many bearings is now reduced to approximately 1 hr. per full 24 hr. operation. Other similar installations are used at various points in the plant, although not as extensively.

Another type of lubrication system worthy of mention is the Mist-Air system, which also is very effective.

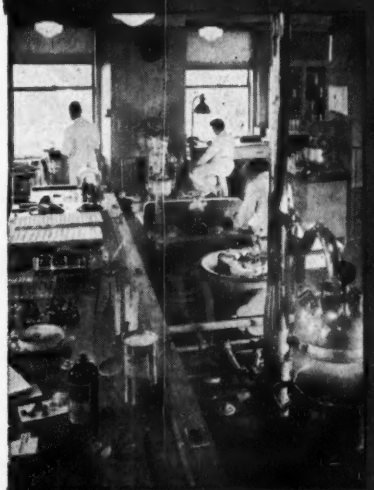
All told, our failures have been negligible, considering the area covered and the great number of lubricating points.

Safety Included

While good lube storage has been carefully considered, sufficient and proper tools provided, a systematized method devised, and time-saving systems installed, the function of a lubricating program is not complete without a good application of safety methods.

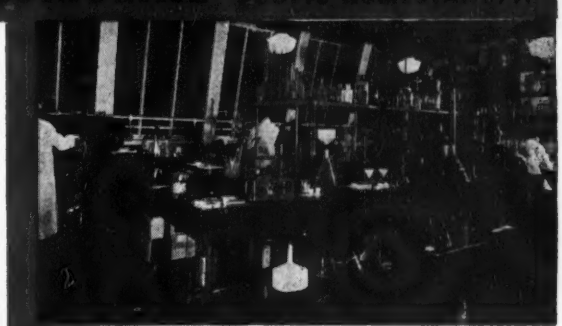
As indicated, any excess lubricants dropping on the floors become slipping hazards if not promptly cleaned.

LOW-COST PRODUCT PROTECTION



For over forty-five years **NULOMOLINE®**—the *pioneer* invert sugar—has been used as a "BALANCING" ingredient by Bakers, Candymakers, Syrup Processors, Fruit Preservers . . . in frozen foods, desserts, icings, toppings, spreads, and other food preparations.

NULOMOLINE is hygroscopic . . . attracts, retains, and equalizes distribution of moisture . . . retards crystallization . . . increases osmotic pressure . . . stabilizes density of syrup portion . . . resists fermentation . . . controls texture and consistence . . . promotes product uniformity . . . improves taste and appearance.



Packed in large and small containers—
in tank wagons and tank cars.

ORDER DIRECT OR THROUGH YOUR JOBBER.

Write, phone, or call and discuss your problems in confidence with **NULOMOLINE SERVICE.** Our technical and practical staffs are *at your service!*

THE NULOMOLINE DIVISION
AMERICAN MOLASSES COMPANY
Manufacturers of NULOMOLINE *(Standardized Invert Sugar) and Syrups*
120 WALL STREET, NEW YORK 5, N. Y.
330 East N. Water St., Chicago 11, Ill. 751 Terminal St., Los Angeles 21, Calif.
NULOMOLINE, LTD.: 1410 Stanley St., Montreal 2, Canada

For more information, use coupon on page 233.

Versatile

INDUSTRIAL SOLVENT PUMP

(FIGURE 4703)

Features of this unit extend its scope of applications from pumping gasoline and oil from underground tanks to pumping many kinds of industrial solvents and other liquids.

For hazardous conditions, this pump is furnished with a vertical solid shaft explosion proof motor. Standard open type motor is furnished for non-hazardous conditions.

Since the Turbine assembly is always submerged, the liquid is actually pushed through the system in a steady continuous flow. Pumps are self-venting and do not vapor lock. Priming difficulties are eliminated and instant delivery of gasoline assured, regardless of outdoor temperature conditions.

Other features of this efficient pumping unit merit your investigation. Capacities range from 15 to 75 g.p.m. for pressures up to 100 lbs. (depending upon capacity).

Write for complete details.

THE DEMING CO.
556 Broadway • Salem, Ohio

Specify DEMING PUMPS

Also, excess oil and dust can cause fires. Good housekeeping, therefore, is a very important duty of the lubrication men.

In addition, accessability to all lubrication points is very essential. Suitable ladders and platforms should be provided wherever needed. Above all, safeguarding of all moving parts of equipment—such as sprockets, chains, pulleys—must be a principal consideration in order to obtain the best results in any good program.

Above article is taken from an address by the author at the recent First Western Plant Maintenance Show & Conference in Los Angeles.

End (Resume reading on page 50)

Stainless Castings

—Continued from page 60

trough. The raw materials are blended in this trough and subsequently are transferred to the main feed screw, which forces the somewhat abrasive dough mixture with considerable pressure through a die in the extrusion head.

Handling 1,000 lb. per hour on a 24-hr. basis, the feed screw must meet stringent requirements for high strength, corrosion- and wear-resistance. Type CF-20 cast stainless alloy was selected for the feed screw. The pressure exerted by the cast screw enables the extruded macaroni product to retain its shape while still wet.

Baby foods encompass virtually the entire range of food products, including meat and fish as well as fruits and vegetables. Processing machine components in contact with such foods are made of stainless alloys, and some machines use stainless for the entire construction.

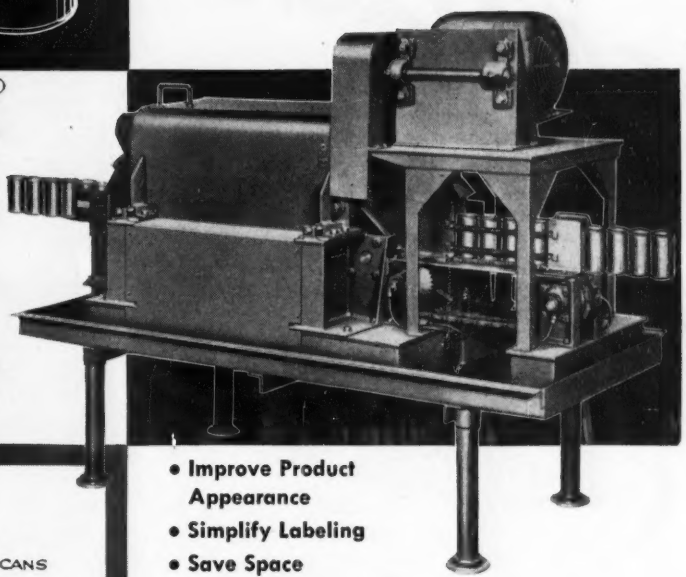
Crushing, grinding, mixing, shredding, puffing, blending, and homogenizing operations on wide varieties of foods involve exposure of the equipment to both acids and alkalis. Alloys of the CF-8 and CF-8M types meet this requirement with respect to all corrosive foods, including the animal acids.

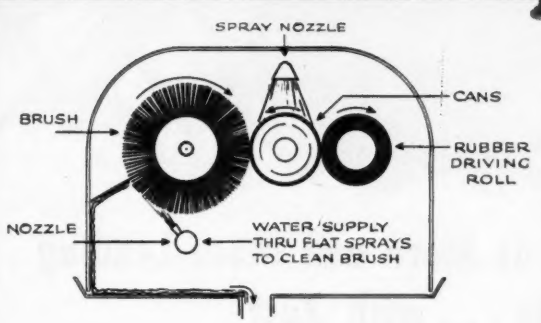
The manufacturer of a multipurpose disintegrator (Rietz Manufacturing Co.) has incorporated many stainless castings in the machine. This high speed device requires construction material that will resist erosive as well as corrosive action of food products. Type CF-8 alloy is normally used for the body, bowl, and other parts. Occasionally, Type CF-8M is used for specific conditions. For example, a large processor of corn specifies the molybdenum-containing type for parts contacting his product.

End (Resume reading on page 60)

You can Eliminate THIS

with the REX® Roto-Brush Can Cleaner and Dryer





HERE'S HOW IT WORKS—Cans enter machine vertically and are turned automatically to an endwise position. They travel in a depression between a rubber roll and the long-lasting, *self cleaning* brush. The roll holds the can against the brush and revolves it rapidly. The brush scrubs the can thoroughly as it revolves while Rex Flat Spray Nozzles direct a hard-hitting stream of detergent spray against brush and can. In a few seconds the can is completely clean and dry, ready for the next step.

- **Improve Product Appearance**
- **Simplify Labeling**
- **Save Space**
- **Save Time • Cut Costs.**

Here's the effective answer to cleaning and drying of most sizes of cylindrical cans. The Rex Roto-Brush Can Cleaner and Dryer completely *removes all overflow from the sides of the cans*...assures permanent sticking of labels, eliminates rusting and unsightly "soak through" on labels.

This efficient unit eliminates need for long air drying conveyors. Washing and drying can be concentrated into a 3′ x 7′7½″ to 8′1″ area. The whole cleaning or drying operation is done in seconds...cans are moved at speeds up to 300 per minute.

Why not assure bright, sales-making containers for your product. See your Chain Belt District Sales Engineer or mail the coupon.

CHAIN BELT COMPANY

District Sales Offices in all principal cities.

CHAIN BELT COMPANY 54-208
4783 W. Greenfield Ave.
Milwaukee 1, Wisconsin

Send me informative literature on the Rex Roto-Brush Can Cleaner and Dryer.

Name.....

Company.....

Address.....

City.....*Zone*....*State*.....

For more information, use coupon on page 233.

When the FLAVOR is there -the Customers are too!

Magnify Natural Food Flavor as More and More Leading Food Processors Do . . . with Zest

Your brand will be their favorite if you use *Zest* to produce more satisfying, tastier products. This miracle seasoning—pure Monosodium Glutamate—intensifies natural flavor *already in* canned foods, without adding flavor, aroma or color of its own. Low cost *Zest* is effective in tiny amounts, added either before, during or after processing. Use it in canned soups, fish, stews, vegetables, meats, poultry . . . and scores of other foods. Boosting food flavor with *Zest* is a proven method of increasing volume sales in both canned and frozen foods. Write today for all the details about profit-making *Zest!*

Zest®

-for food that tastes better sells better!

Staley's 99+% Pure Monosodium Glutamate

A. E. Staley Mfg. Co., Decatur, Illinois

OTHER QUALITY STALEY PRODUCTS FOR FOOD PROCESSORS

SWEETOSE®—enzyme-converted sweetener for firmer texture, better flavor

Sta-Sol®—lecithin concentrate gives more complete mixing, prolongs shelf life

Staley's C. S. U.—High quality standard corn syrup

ADVANCES IN TECHNOLOGY

Develops New Cheese

Excellent cheese can be made with a white mutant of *Penicillium roqueforti* prepared from parent strain by irradiation with ultra violet light.

Experiments were made with cheese curd from a vat of mixed-herd raw milk. One portion was left uninoculated, the other three were inoculated with parent strain of *P. roqueforti* and with each of two mutants, respectively.

One mutant was found to be superior to the other, producing a cheese of desirable body characteristics and distinctive color, together with a wide variation in intensity of desirable flavor. This cheese was sufficiently different from Blue cheese to constitute a new product which may be classed in the semi-soft, mold-ripened group.

A new approach to cheese manufacture is seen in the fact that ripening organisms can be altered genetically so that they have a different appearance and show different biochemical behavior.—*Journal of Dairy Science*, 711-16, June, 1954.

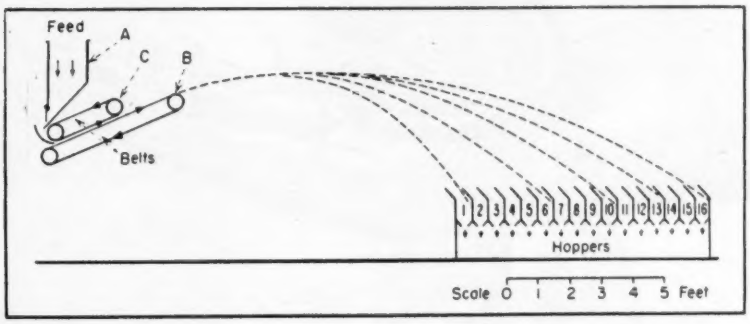
Freezing Shrimp At Sea

Small-scale trials of brine-freezing shrimp at sea in coastal area of the Gulf of Mexico have demonstrated feasibility of procedure, and superiority of product compared with shrimp iced at sea.

Icing shrimp for more than 10-12 days creates a quality problem, whereas freezing will permit a vessel to make trips of 4-6 weeks' duration. Several methods are available, depending on the size of boat and capital required for freezer installation. Freezing in low-temperature brine for later thawing and refreezing ashore yields a product with color, flavor, and texture comparable to air-frozen shrimp, and offers advantages over other systems.

Following procedure is recommended for freezing aboard vessel: Use only fresh, firm whole or headed shrimp; chill in fresh ice-water; freeze at zero to 5 F. in strong 22.4% salt brine, circulating brine continuously.

Processing ashore: Thaw shrimp in running cold (60 F.) water for 10-15 min., remove from thawing tank, and cut heads from whole shrimp. Rinse and cull unsound ones. Pack in waxed cardboard cartons and wrap with moisture-vapor-proof film. Refreeze at −10 F. or lower, and store at 0 or lower.—*Commercial Fisheries Review*, Vol. 16, 1-9, July, 1954.



Device Separates Out Sound Wheat By Projecting Grains Into Air

An apparatus has been developed that eliminates internally infested kernels from a stream of wheat and, at the same time, continuously separates the grain into fractions of increasing test weight.

Called grain spectrometer, the device takes advantage of mass changes induced in a kernel as the insect develops. In it, a stream of kernels moving with uniform speed is projected into still air. Air drag and gravitation cause infected kernels to fall short of sound ones. Dispersed grain is collected in a series of hoppers.

Apparatus consists of a hopper (A) with adjustable slide-feed regulator, 2 parallel belts (B and C) driven at the same speed but in opposite directions, and series of receiving hoppers into which grain falls—numbered 1-16 in diagram above.

Belts move at approximately 1,380 ft./min. and are set to project grain upward at a 25 deg. angle. Space between belts is variable and was set at about thickness of a single layer of wheat.

First test of unit was separation of 5 bu. commercial No. 2 hard red winter wheat of 61.4 lb. weight, that had been passed through milling separator. Weight of fractions increased progressively from 55 lb. in No. 1 hopper to 64 lb./bu. in No. 15. Grain varied in appearance from thin, shriveled and broken kernels in hoppers 1-3, to grain of increasing plumpness in hoppers of higher numbers.

In tests with wheat known to contain 8.5% infested kernels—by radiographic inspection—hoppers 1-6 inclusive collected less than 2% of total sample. Infestation in this group was 35%. Hoppers 12-16, with 49% of sample, had 1.5% infestation. Compositing fractions from hoppers 7-16 and reprocessing them gave wheat in hoppers 12-16 significally cleaner than composite.

Additional tests were conducted by separating 15 red winter wheat samples into as many as 16 fractions by the spectrometer and checking these for weight, moisture, protein, and ash content. Small fractions from end hoppers were usually discarded leaving 12-14 fractions.

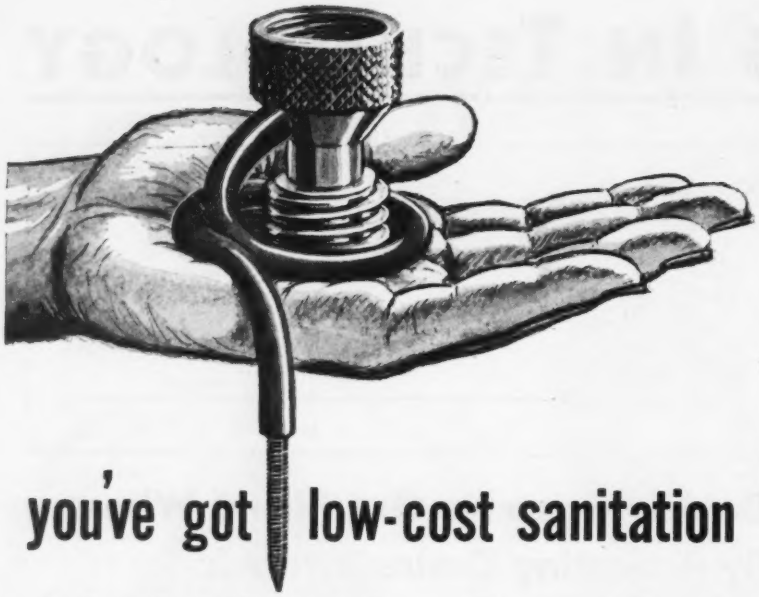
Common characteristic of all samples was systematic increase in weight with increase in distance from feed belt. Protein content diminished with distance, as did ash content to a lesser degree. Of original samples, approximately 64%, comprising fractions 1-8, contained 1% more protein than original grain. A strong inverse relationship was found to exist between kernel plumpness and protein and ash content.

This technique is seen having the following practical applications: (1) Separating commercial wheat into fractions of various protein contents, and (2) segregating significant amounts of high test weight material from low test weight wheat.—*Cereal Chemistry*, 316-25, and 326-32, July, 1954.

Poultry Stuffing Found Good Bacteria Medium

In tests to determine: (1) Bacteria growth in stuffing of frozen, ready-to-cook poultry, and (2) effectiveness of packaging materials, it was found that bacterial population does not change appreciably during storage at −10 F., nor for first 20-24 hr. at room temperature.

When room temperature is reached, however, aerobic and anaerobic bacteria



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increase rapidly up to 64 hr. This is accomplished by an increase in acidity and development of off-odors.

Data showed no significant difference due to packaging materials used —Cryovac, Pliofilm, and Cellophane. Vacuum packaging was found more effective in preventing mold growth on surface of poultry, and in inhibiting freezer burn or dehydration.—*Journal of Milk & Food Technology,* 245-50, Aug., 1954.

Brine Immersion Cooling Saves Time and Labor

The feasibility of using brine immersion to cool packaged, warm, eviscerated, ready-to-cook poultry and freeze it has been studied with encouraging results.

Broilers, fowl, stags, young hen turkeys and mature tom turkeys were used in the experiments. Packaged and unpackaged birds were tested, former being packed in moisture-vapor resistant bags of vinyl plastics. Comparative tests were made with slush ice at 33 F.; water at 33 F.; brine at 23, zero, and −20 F.

For a given cooling medium and bird class, it took 2-3 times as long to cool, and twice as long to freeze, the packaged birds as those unwrapped. But, in comparison with commercial practice of slower freezing in air, the method is relatively rapid, and it appears to result in noticeable saving in time, labor, and handling. Also it eliminates leaching of flavor that occurs with slush ice cooling.—*Refrigerating Engineering,* 61-63, 100-102, July, 1954.

Mixed Cheese-Starters

Introduction of large bulk starter vessels in Australian cheese manufacture necessitated blending of two single-strain cultures one stage ahead of cheese vat.

This change in commercial practice emphasized importance of mutual compatibility of the two strains, and led to many tests of blended strains and species of Streptococcus. Observations were made on relative survival of two strains, some of different and some of same species, when mixed and subcultured.

Related studies were made of composition of mixed proprietary starters used commercially. Three species, *Str. cremoris, Str. lactis,* and *Str. diacetilactis* are used in making Cheddar cheese, and knowledge of their relative compatibility would be useful in building up multiple-strain starters.

In a pair consisting of two strains of *Str. cremoris,* one became dominant

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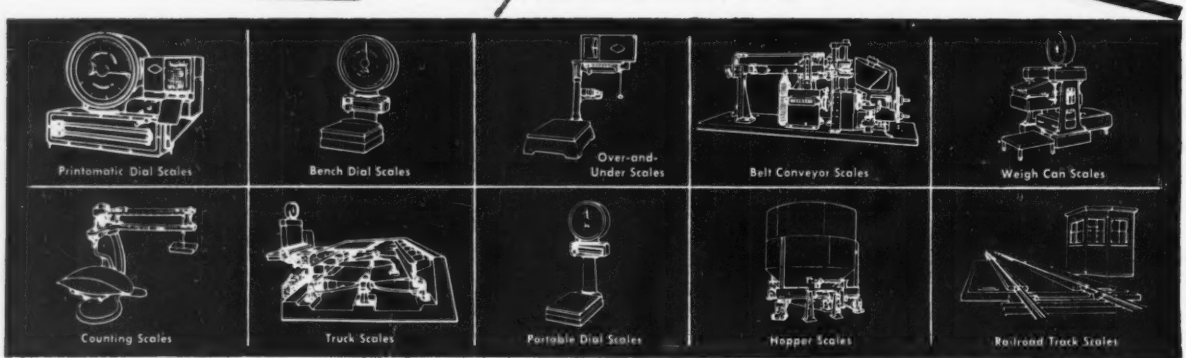

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after three transfers. In a *lactis-cremoris* pair both strains were present after three transfers, and blend was more active than either strain alone.

Another laboratory blend of 4 strains —2 *cremoris* and 1 each of *lactis* and *diacetilactis*—was used daily without failure through an entire season. After 9 months this culture contained 3 original strains, 1 *cremoris* having disappeared.

Of 35 commercial mixed starters examined, 4 contained strains of all 3 *Streptococci* and maintained good activity. It appears that in the majority of blends consisting of *cremoris* strains, one becomes dominant rapidly. Long persisting blends of *cremoris* with either or both of the other two were more frequently obtained, and some of them had higher activity than either of the component strains alone.—*Australian Journal of Dairy Technology*, Vol. 1, 15-18, Jan.-March, 1954.

Chelating Compounds Inhibit Oxidized Flavor

Salts of ethylene diamine tetra acetic acid will effectively inhibit oxidized flavor of milk caused by presence of copper.

Quantity needed for complete protection is of the order of 5 times the amount of copper on a molar basis.

These results were obtained experimentally on pasteurized homogenized milk processed in commercial plant equipment. Chelating agents were the: Disodium salt; disodium calcium salt, and tetrasodium salt of the above mentioned acid. Flavor defect was induced by adding solution of copper sulphate prepared with five molecules of water.

Chelates were equally effective when added either before or after pasteurization, or before or after the addition of copper. The inhibition is attributed to complexing or tying up of copper ions and probably other ions, rendering them ineffective as catalysts or as activators for certain enzyme systems.—*Journal of Dairy Science*, 819-24, July, 1954.

Handling Starch Wastes

Potato starch plants discharge six types of waste effluents: Flume water from washing potatoes; pulp containing about 4% solids made up of peel, fibers, and some starch; protein water containing most of the soluble ingredients, and three starch waste waters and filtrates.

Potato pulp and protein water contribute 95% of the pollution load, but these can be dried and used as feeds. Pulp has a 5 day B.O.D. of

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348 to 200 per ton of potatoes, or from 2800 to 1600 per ton of starch.

Plant with an output of 30 tons/day at 12.5% yield, would have an average population equivalent of 84,000 without pulp recovery, 48,000 with such recovery. About 91% of the nitrogenous compounds are soluble in the juice and wash water used in grinding, which make up the protein water with its B.O.D. of 5400 ppm.

Nearly 41% of soluble nitrogen can be coagulated by heating to 182 F., and 60% by reduction of pH to 3.25. Coagulated protein is difficult to dry, and would probably require spray drying.—*Industrial & Engineering Chemistry*, 1331-34, *June*, 1954.

Properties of Diacetin Fats

Diacetin fats, which are saturated triglycerides containing two acetyl groups for each molecule, promise some interesting industrial uses, particularly in the food field. They are unique in that they form waxy, highly flexible solids, with properties that suggest use as coatings and fillings.

These fats are prepared by random interesterification of selected normal fats with triacetin in presence of catalyst such as sodium methoxide or sodium suspended in xylene. Ultimately the diacetins are distilled at a temperature that depends on the component high-molecular-weight fatty acids. The distillation cuts are sharp, and yield close to theory.

Five principal properties characterize these fats: (a) Waxy translucency; (b) sharp melting point at a relatively low temperature; (c) flexibility; (d) oxidative stability, and (e) great stability in the alpha polymorphic form. In addition to coatings for food products, diacetins may be used for icing fats, filling fats, dessert fats, salad oils, and base stocks for shortenings or margarines.—*Journal of the American Oil Chemists' Society*, 196-99, *May*, 1954.

Insects in Grain Detected By Sound Amplification

Internal infestation of grain by insects can be detected by electronic amplification of sounds they make in moving and feeding.

Apparatus developed for this work comprises an amplifier, power supply, sound-proof box, and auxiliary equipment for analyzing sound patterns. Design of sound-proof box proved to be an exacting problem because sounds of very low intensity originating in the building interfered with detection of those due to insects. Innermost item in the sound-proof box

is a microphone attached to a small metal cup or tray in which the grain is placed.

Two distinct sounds are detected, associated with the larval and pupal stages of insect growth—a low-frequency scraping noise and a high-frequency tearing or rasping sound.

It has been deduced by repeated observation that three sounds are caused, respectively, by movement of larva and pupa within the kernel, and by chewing of grain endosperm by larva. Sounds are clearly differentiated by the oscilloscope.

One practical application of the method is a means for rapid evaluation of effectiveness of fumigants without waiting for emergence of surviving insects. Another would be a means for monitoring grain for infestation in storage bins, much as permanent thermo-couple systems are used for checking heating of grain in storage.—*Cereal Chemistry*, 271-76, May, 1954.

Protein Nutrition Studies

Minimum level of dietary protein necessary to maintain nitrogen balance is affected by the non-protein fraction of the diet. Different observers obtained different results, the discrepancy being due to the different ratios of non-protein to protein calories in the experiments. Calorie intake must be raised above a certain minimum to maintain nitrogen balance. Contradictory results of experiments designed to determine protein requirements show that nitrogen balance cannot be the only criterion.

Measuring protein stores of the body is of possible value in determining protein requirements. Change from undernutrition to adequacy was demonstrated in a patient who was measured before treatment, and after 21 and 64 days' feeding. Body weight increased, and plasma volume and total proteins improved from minus to plus values.

Paralleling optimum protein and amino acid requirements is the matter of their availability in foodstuffs. There are a number of drawbacks to chemical analysis of protein foods to show whether the required amino acids are present in adequate quantities. Also, their food value is affected by rate of absorption, the significance of which in human nutrition is not yet apparent.

One of the most elaborate investigations into accuracy of determining amino acids was participated in by 25 laboratories in a 4-year project. Six selected proteins were analyzed by several methods, and their nutritive value was also determined on various

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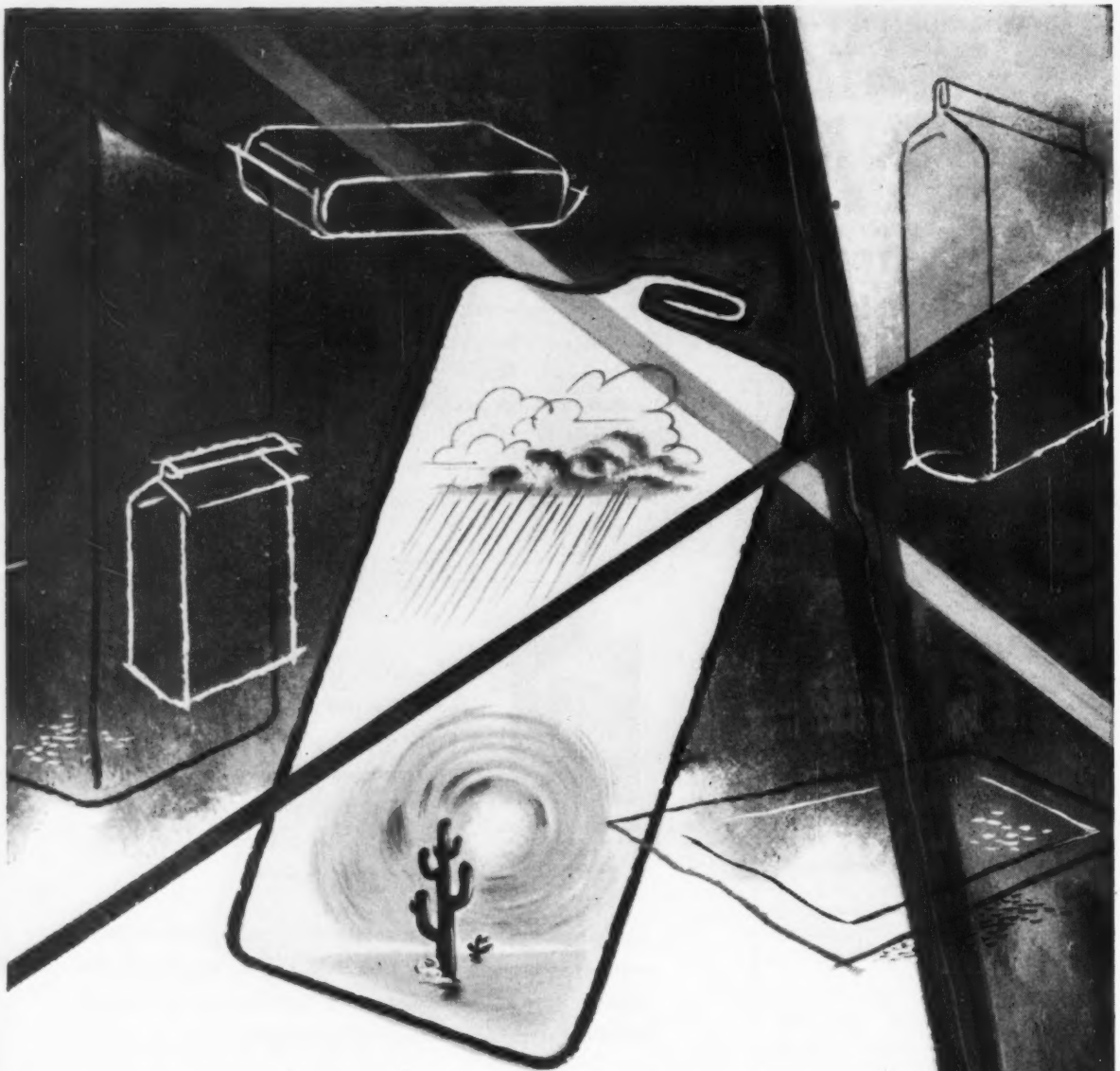

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animal species. Extremely large variations in results were shown. This indicated the difficulty of estimating amino acids. By contrast, there was good agreement in biological assay for B. V. of proteins. Drawback to this method is arduous nature of determination, requiring seven weeks and 120 duplicate estimations of nitrogen. Among other novel procedures are the microbiological assay for B. V. of proteins, and measurement of interrelationship of dietary proteins and tissue enzymes.—*Food Manufacture*, 183-86, May, 1954.

Cacao Antioxidants

Recent experimental work has confirmed earlier indications that cacao contains substances that are antioxidative for milk fat.

Butteroil was used in two accelerated tests—the Schaal modified and Swift fat stability—to determine antioxidant properties of cacao shell, cocoa powder, and extracts of these products.

The cacao antioxidant was effective in retarding oxidative deterioration of milk fat, and more so when copper was added. It was also an inhibitor of the pro-oxidant effect of copper. Concentrated water and alcohol extracts of cacao shell were more potent than the shell or cocoa powder. The dried water extract was more effective than Viobin in retarding oxidative spoilage, but less so than caffeic or tannic acids, and nearly equal to NDGA.

A tannin-like substance extracted from cacao shell was less potent than pure tannic acid. The cacao inhibitor at a concentration of 0.05% imparted a foreign flavor to the butteroil. It has not been determined whether cacao antioxidants are nontoxic.—*Journal of Dairy Science*, 754-60, June, 1954.

Properties of Sugar Dust

Dust explosions are one of the hazards of fine grinding operations in which starch and sugar or other organic dusts may be formed.

Conditions under which dextrose, sucrose, and raffinos dusts will explode, and maximum pressures generated by their explosion were studied by means of a chamber in which a brief blast of dry air created the dust cloud which was ignited by a high tension electric spark.

For the sugars used, minimum and optimum explosive concentrations decreased with increasing particle size and with increasing molecular weight of the sugars. Thus, dextrose particles with surface area of 4500 sq. cm./g. exploded at a concentration of 20 g./cu. m.; particles of the same sugar with surface of 1480 sq. cm./g. did

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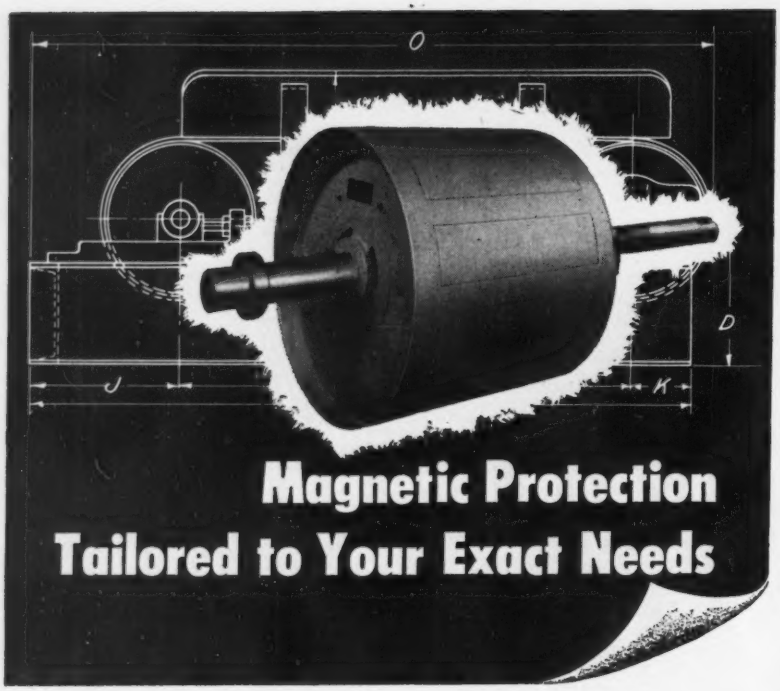

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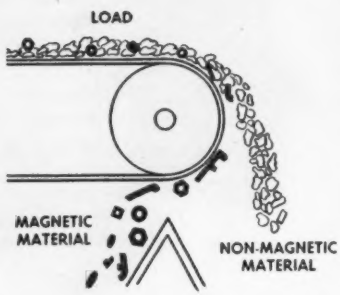

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not explode until concentration reached 300 g./cu. m.

For equal specific surfaces, pressure of explosion decreases with molecular weight, a affioose explosion had a maximum pressure of 37 psi. compared to 68 psi. for an explosion of dextrose particles of similar surface. Very fine dusts of simple sugars will therefore explode at lower concentrations, and produce more powerful explosions than coarser dusts of the di- or trisaccharides.—*Industrial & Engineering Chemistry*, 763-766, April, 1954.

Passion to Patience

—*Continued from page 55*

for self-service cases—a job that was not too well done because of lack of equipment.

Came Mechanization

It then grew apparent that the packer could do a better and more economical job, while at the same time retaining the identity of his product.

For there became available the present types of packages—cardboard backers with cellophane overwrap, shallow trays with a cellophane window, wallet packs, and vacuumized flexible pouches.

However, much hand labor is required to put up these packs—and in our specific thinking we always keep in mind high labor costs. Each worker draws over $670 per year for non-productive work in our plant. This is for fringe benefits, welfare, paid holidays and vacations, and a variety of other benefits. Therefore, we think twice before setting up a packaging system calling for a lot of manpower.

After several false starts, we hit upon a tray in which the wieners could be machine-wrapped. Involved was a system of pans on a gravity conveyor that brought the wieners from the peeling table to the packing station. Here, weighers and packers filled the cartons with 1 lb. of wieners, then placed the cartons on a conveyor taking them through the wrapping machine.

Production by this method averaged 190 lb. per man-hour, or slightly less than 1¢ per lb. Knocked-down trays cost a little over $15 per thousand.

While this technique is probably far more efficient than the ordinary cellophane overwrap, we did not have the assembly-line set up for best utilization of our conveyor going to the automatic wrapping machine.

Then after much trial and error, we finally developed our present method: A Palmer carton-forming machine sets up the carton from a flat scored board

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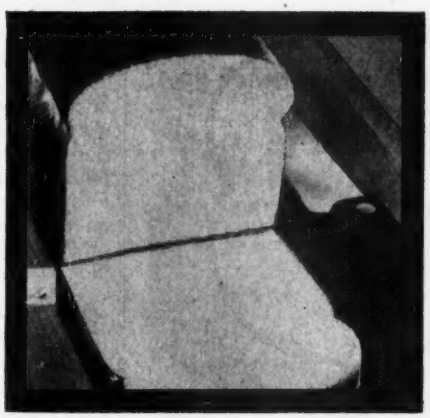

In candy, Cerelose exerts good grain control, produces mixes that deposit better in the mogul, and contributes to a longer shelf life.

Cerelose is indispensable in the manufacture of ice cream, sherbets and ices because it controls crystal formation, yielding smooth, uniform textures which promote true flavors and a longer shelf life.

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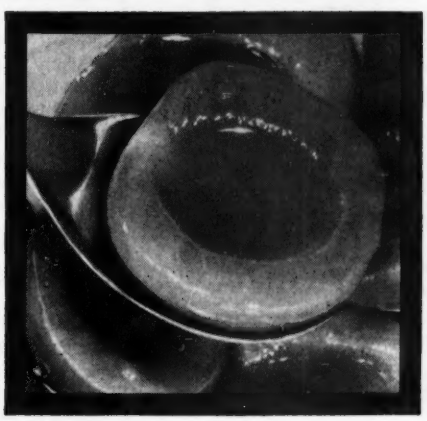

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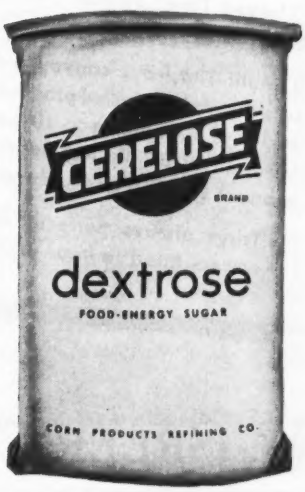

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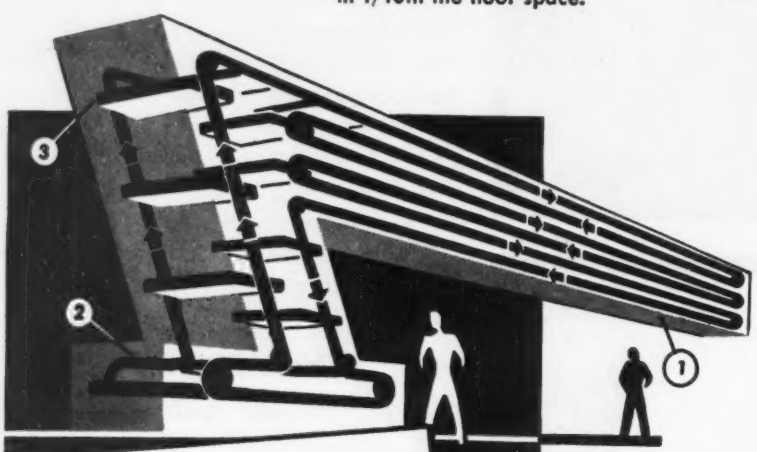

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and automatically deposits it on a moving conveyor.

Wiener peeling is done by girls on one side of the conveyor. Peeled wieners then go into a hopper that slopes toward the packing girls on the other side of the conveyor. The packers fill into the cartons as they move past on the power conveyor, which then carries the filled cartons into the wrapping machine.

Using this method, output now averages 295 *lb. per man-hour*—less than ¼¢ per lb. And the tray cost is slightly over $9 per thousand.

We are quite proud of our present wiener package and method of packing. In the transition from the old bag of wieners to our present package, we have come a long way. It is not the final package, but it will do until we develop a better one.

Sliced-Bacon Factors

Now let us follow through on another product—sliced bacon.

Back in the days of the stockinette-bagged wieners, most bacon was sold in the slab. Originally the housewife sliced it at home. Then the butcher, and later the packer, began to slice and package it.

Immediately came the problem of keeping the bacon fresh and sweet. Perhaps that very first package was a plain rectangular closed carton, later to be parchment-paper wrapped. This package was not successful, inasmuch as it was not transparent. Cellophane was next used, but smearing of the bacon fat made a messy package after it was opened.

At the same time as this trial period, consumers were demanding a milder cure, also less salt and smoke—factors which extended the keeping quality of bacon.

Thus, we were in a quandary: We were finding it necessary to slice bacon and expose more of it to light and air—its mortal enemies. And the public's call for lessening the salt content and smoke flavor meant the product would be more vulnerable to rancidity.

Many packages and various materials were tried and abandoned. Self-service probably accelerated the search, with the result that there are now many different packages. Many comprise a board base with a cellophane overwrap. These do lend themselves to a machine overwrap, but there the benefits end.

We did not, and do not, like the overwrap for two main reasons: It offers very little product protection against light and air. After being opened by the housewife, it no longer is a package—merely a board tray. However, it does offer visibility in the case, which is highly desirable.

For more information, use coupon on page 233.

We finally selected a specific package–which then was promoted as our "book pack." It employs a waxed glassine laminated to waxed sulphite board.

Debut of the "Book"

By actual test, bacon packed in this carton held its freshness and flavor three weeks longer than any other package we tried. In the home, it remained a stable handy package until the last slice was used–at all times keeping the product fresh.

Sadly enough, opening of the package was required to view the product. We tried taping it shut. The consumer broke the tape, often tearing the package. We overwrapped it to keep the consumer from breaking into it. But this package did not sell well at self-service.

Meanwhile, this package was purchased like hot cakes in the service-type stores. Reason was that the retailers had a chance to sell its merits. Yet with self-service now predominant, a package has to sell itself.

We *had* proved, however, that our package protected the bacon, was attractive, made a good container for easy handling in the refrigerator, and sold well when the butcher had the opportunity to explain its merits.

All was fine, except that self-service was rapidly growing. The package had to have both visibility and protection. Tested were dozens of different methods, none of which met our needs. We continued with our book pack, meanwhile experimenting with other methods. And while our book pack sales held up, our self-service package business continued to decline.

By this time, nearly all sliced bacon was being sold in a variety of packages, all basically a board with overwrap. Other than differences in color and trademark, the packages were remarkably similar.

We had been toying with a package made of the same material as our book pack, plus a polystyrene window covered by a flap. It was quite an innovation, but was still being used experimentally by a major packer.

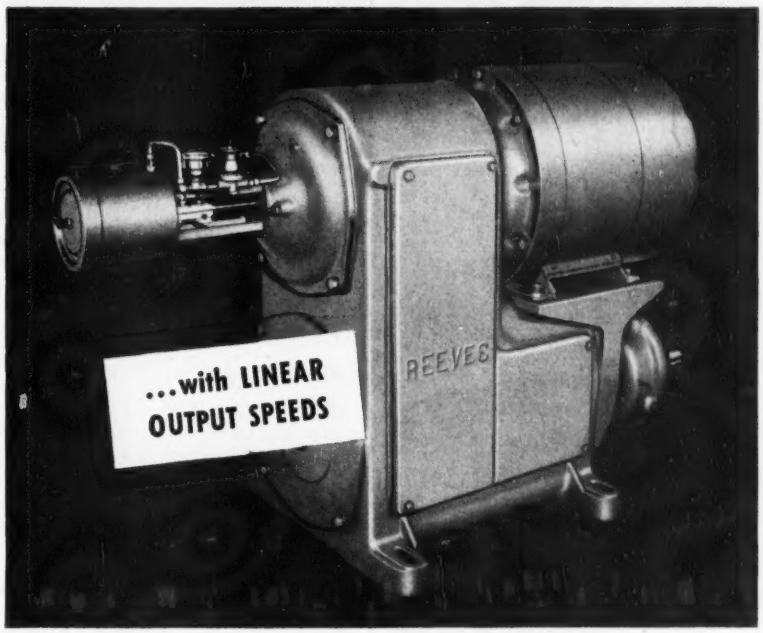
Finally, it seemed obvious that if we came out with a board-overwrap package we had nothing new to sell and were at the same time abandoning the protective feature of our current package.

We felt we could try out the "peek-a-book" package, stressing the protective feature, handiness, and visibility. Our decision was a good one, and our problem is solved–at least for now.

The above article is taken from the talk by the author at the recent Packaging Conference in St. Louis.

End (Resume reading on page 55)

New *Automatic Speed* Control for Continuous Processing



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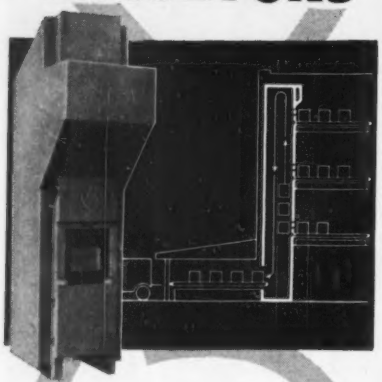

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Questions & Answers

THIS MONTH'S PROBLEM

Water Softener on "Fritz"

Question—Recently, a quality impairment in one of our products was traced to an excess of a mineral which we thought had been reduced to a satisfactory level in our zeolite water softener. Our water analysis has not changed appreciably during the several years that this softener has been giving us satisfactory performance. We are, therefore, at a loss to account for the present difficulty. Can you help us find the cause and cure?

AUGUST PROBLEM

Chlorinating Cooling Water

The question was—We are giving some thought to chlorinating the water in our company's cooling canals. Can you give us some idea as to the concentration of chlorine we would have to establish, and what it might cost to chlorinate this water?

Answer—We understand that a number of canneries do treat cooling-canal water with chlorine, although the practice is by no means universal.

As a matter of fact, there are two schools of thought on this subject. Some feel that as long as there is any possibility of any cooling water being drawn into cans of food during cooling (because of minute defects in seams, denting, or other mechanical causes), it is a wise precaution to chlorinate the canal water to make it incapable of causing spoilage of the product.

Others, however, feel that chlorination gives a false sense of security, and that cans capable of drawing in water may later take in contamination from the air or other sources anyway.

Our department does not presume to take sides in this matter.

Chlorinating equipment is obtainable from reputable manufacturers and may be expected to operate safely and efficiently. Equipment for a typical installation of around 500-gpm. flow would cost, roughly, about $3,500. This equipment would require little space and would automatically feed chlorine from pressure cylinders at a pre-set rate.

A chlorine concentration of 4.5-5.0 ppm. is considered adequate for this application. This amounts to about ¾ lb. of chlorine per 100 gal. per min. water flow per hour of operation. Or, considering the 500-gpm. installation used as an example above, it runs about 10 lb. for each 8-hr. shift.

Shipped in pressure cylinders, the chlorine gas may cost about 11¢ per lb., making material-cost in our example a mere $1.10 per shift.

Making Cheesewieners

Question—Some of our customers want skinless cheesewieners. Can you provide us with a formula and instructions?

Answer—If you are making frankfurters, then merely follow your present procedures—only difference is to substitute American process cheese for about 15% of the meat trimming.

If you aren't, then:

Separately grind through a ½-in. plate, 70 lb. of beef trimmings, 6 lb. of onions, and 50 lb. of veal trimmings. Now grind 50 lb. pork trimmings through a ⅜-in. plate. Next cut 30 lb. cheese into about 1 in. cubes. Then finely chop 4 oz. garlic and mix with 5½ lb. of sausage-meat cure (1 oz. of sodium nitrite, 11 oz. of sodium nitrate, and 2 lb. of corn sugar—all water-dissolved to make 1 gal.).

Chop-mix for a few revolutions in a silent cutter, ground beef, 5 lb. of salt, garlic-cure blend, and a little shaved ice. Alternately add, a little at a time, 10 lb. of milk solids (nonfat). Then introduce ground veal and pork, cheese cubes, onions, and white pepper (12 oz.), and ground mustard (6 oz.). While chop-mixing, add enough shaved ice to make a batch of same consistency as frankfurters.

Finally stuff into cellulose casings, link into 5 in. lengths, smoke, and cook as for regular frankfurters.

What To Do With Waste

Question—What, if anything, can be done with waste solids in our tomato cannery?

Answer — Waste tomato skins, seeds, and trimmings—when dried—are valuable for animal feeds. Unfortunately, effective utilization of this waste is chiefly an economic problem, which varies considerably in each section of the country.

Moisture content of this waste is normally high. And, if hydraulic type of conveying systems are used to handle them, it is even higher.

First treatment step is to remove excess water mechanically by a vibrating or rotating screen, basket-type centrifuge, or a dewatering press similar to that used for spent distiller's grains. Usually, it is more economical to remove water by mechanical means

than by heating. To be taken into consideration are equipment investment and possible availability of "free" waste heat.

Next step is to dry de-watered waste in a horizontal-type, rotary dryer. These are available for direct-firing, steam heat, or indirect heat. Possible use of boiler flue gases should not be overlooked.

Dried waste should then be screened and lumps disintegrated prior to bagging.

Published results of pilot-plant operations indicate that production costs will about offset market price. Hence, there will be no profit, and more likely there will be a loss.

Although there is a market for this dried waste, its production should be looked upon as an inexpensive way of disposing of it where no other satisfactory disposal facilities are available.

Troubled Slicing Rye Bread

Question—We have a serious problem—slicing rye bread. The dense and gummy interior of the loaf, together with the hard outside crust, preclude the possibility of using the modern high-speed, band-type slicing machines. Inherent in the reciprocating-type slicers is the difficulty of controlling the thicknesses of the bread slices. Characteristics of the loaf necessitate the use of a reciprocating-type slicer. Too, unevenness of different slices in the same loaf is highly undesirable. Employed in our case are the conventional hard fiber guides, designed to maintain uniform slices. If adjustment of the guides is too close, guide spaces become filled with dough and the blades then bind. Blades are not controlled, on the other hand, if the adjustment is too loose. Have you any suggestions?

Answer—It is doubtful if present slicers will handle rye loaves in the manner you wish. This is particularly

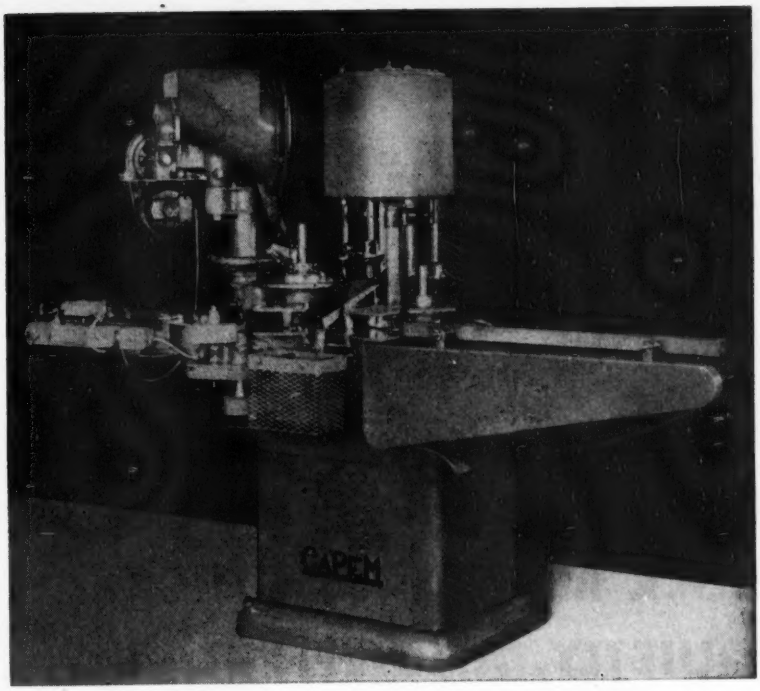
How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



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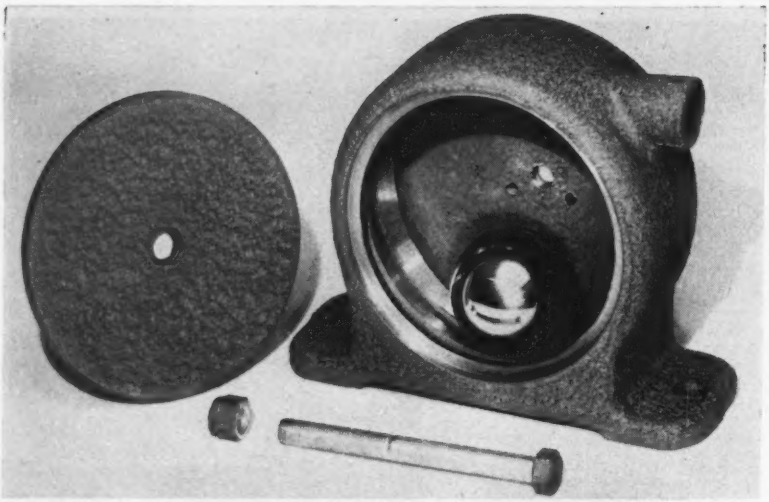

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AiroViber's one moving part is a steel ball. An air jet blows it at high speed around a ground and hardened steel track in the housing. The weight of the ball develops a strong centrifugal force, which the vibrator transmits through its mounting into the object to be vibrated. It will start and operate under any condition and performs at high or low temperatures. AiroViber is not affected by humidity.

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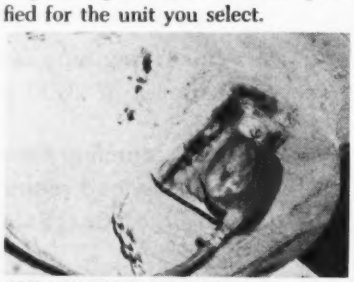
The AiroViber is almost fool proof in operation. Because it has no close fitting parts to lubricate or adjust, it will start every time you open the air valve. You can install it in hard to get at locations with full confidence that it will operate without lubrication or maintenance for a long time.

No Installation Problems

AiroViber is easy to install. It does not need any special line oilers or air filters. Merely hook up an air hose large enough to deliver the air specified for the unit you select.



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true with breads having a gummy interior, which develops a deposit on the knives. And as this deposit builds up, it results in an undesirable rubbing action against each slice.

Moreover, the problem is aggravated by the irregular, cigar-like shape of the rye loaves. White breads, on the other hand, are somewhat uniform in shape—at least up to the top of the pan in which they are baked. Thus, when white loaves are fed to the slicer, one loaf uniformly presses against the other while moving through the knives. This, of course, is not so with the almost cigar-shaped rye loaves—a factor contributing to slice irregularity.

Q.—Every time we ferment a batch of beer some of our men have to brush off the yellowish deposits remaining on inside surface of vats. Isn't there an easier way of cleaning vats?

A.—One brewery we've visited is coating inside surfaces of fermenting vats with a filter aid-slurry that absorbs fermenting deposits. Then after the batch is pumped out of fermenter, a porter simply pressure-hoses the "filter aid-white wash" from the surface of vats.

Perhaps these suggestions might help you with your slicing problem, though they won't give you the output you wish. One is to slice the loaf, one slice at a time, with a rotary or circular-type meat slicer. Such slicers are geared to handle two loaves at a time.

Another is to investigate the use of a small retail bakery-type slicer. This machine operates at varying feed rates—a feature that may enable you to minimize varying slice thickness. This machine is designed for loaves with hard crust and relatively soft interiors that are unable to resist pressures developed by the knives during maximum feed rate.

Making Yeast-Raised Donuts

Question—How'll we go about making glazed yeast raised donuts?

Answer—First of all, we assume you want a formula.

In this case, cream in a vertical-type beater mixer: Sugar, 1¼ lb.; malt, 5 oz.; salt, 5 oz.; and shortening, 3¾ lb. Then slowly add and beat ½ lb. of egg yolks.

Next, beat into batch: Milk (about 78 deg. F.), 10 lb.; yeast, 1¼ lb.; and sufficient mace and lemon extract to suit. Now make into a smooth, medium-soft dough by introducing, with mixing, bread flour, 10 lb. and soft cake flour, 7¼ lb.

Rest dough about 10 min., punch,

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ever hear of white root beer?

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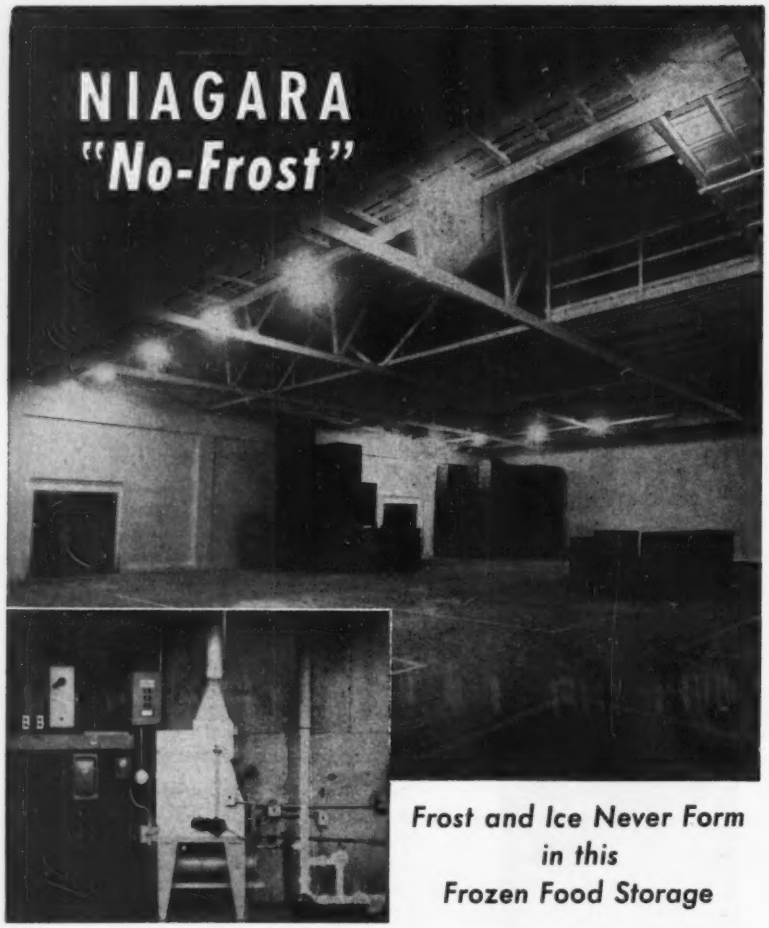

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roll, and cut into 2 oz. doughnut shapes. Proof, fry at 375 deg. F.; glaze with thin sugar icing, drain, and cool before packaging.

As for making the icing. Bring to boil: Sugar, 1 lb.; corn syrup, ½ lb.; water, ½ lb.; and citric acid solution (2 parts water and 1 part citric acid crystals), ⅛ oz. Cool batch and add, with mixing, water, 4 oz.; gelatin, ⅜ oz.; and vanilla to suit. Finally mix into batch, 4 lb. of finely powdered sugar and sufficient water to thin icing to desired consistency.

Peeling Horseradish

Question—How'll we go about peeling horseradish roots?

Answer—There seems to be little information in the literature on peeling these roots—and none of a specific nature.

To the best of our knowledge, general method of peeling horseradish roots is with an abrasive peeler. This is standard equipment, as you no doubt know, which is made of various sizes and types. With it, such products as potatoes, parsnips, and carrots are peeled.

Due to the nature of the horseradish peel, as well as the root's highly volatile oils, process peeling involving heat is not very promising. This involves flame, steam, and hot lye peeling.

On Making Cheese Cake

Question—Please furnish me with a formula for a cheese cake to be baked and shipped in heavy-gage aluminum foil trays.

Answer—Here's a basic formula that you can adjust to suit your requirements:

Mix and cream for 5 min., smooth cottage cheese, 25 lb.; soft cake flour, 3 lb. 2 oz.; butter, 5 lb.; and sugar, 10 lb. Add slowly, 10 lb. of eggs (about one third yolks). Heat 10 lb. of milk to 200 deg. F., and add slowly to mixture to form a smooth batter. Beat to a firm meringue, 10 lb. of egg whites, 5 lb. of sugar, and vanilla extract. Thoroughly fold meringue into batter. Deposit into well greased aluminum trays about 3 in. from top. Finally, bake at 375 deg. F. to a light brown color.

Q.—Do you know how much milk solids are permitted in sausage products?

A.—The BAI (Bureau of Animal Industry) allows no more than 3½% nonfat milk solids in sausage. And such milk-solid-added sausage must be labeled "Nonfat milk solids added."

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274 Glycerine
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October 1954

Wants Another Fudge Formula

Question—Thanks so much for the chocolate fudge formula you sent me. But do you have another for truffle fudge?

Answer—Boil in a steam-jacketed kettle to 246 deg. F.: Sugar, 5 lb.; corn syrup, 1 lb.; invert sugar, 1 lb.; 20% butterfat cream, 2 lb.; and unsweetened chocolate, 1½ lb.

Now turn off heat and add 2 lb. of caramel paste and the same amount of fondant. Blend well and then introduce enough vanilla flavor to suit and 1 lb. of frappe. You can also add chopped nuts or fruits, if you want.

Spread batch on waxed paper to set, and then cut.

Caramel paste is made by mix-heating 4 lb. of coconut oil (about 75 F. melting point), 15 lb. of corn syrup, 3 lb. of invert sugar, and 20 lb. of sweetened condensed milk. Now introduced at this point is a blend of 5 lb. of sugar, 1¼ lb. of tapioca flour, and about 3 oz. of salt. Batch is then cooked to a medium-firm paste.

For the fondant, cook to 246 F. and then cream: Sugar, 16 lb.; corn syrup, 3 lb.; invert sugar, 1 lb.; and water to dissolve.

Frappe is made by boiling to 245 deg. F.: Corn syrup, 10 lb.; adding an equal amount of invert sugar; and then thoroughly mixing the batch. Now the batch is whipped, until light, in a beater-type mixer along with 4 oz. of egg albumen dissolved in 7 oz. of water.

Q.—We've been running into a most unusual situation. Some of our cellophane-bagged jelly beans and candy corn become crushed. These cello bags, for some reason, shrink, and then crush the candies. Any way we can prevent this candy-crushing?

A.—Best thing we can suggest is that you puncture each sealed bag to relieve the vacuum. Meanwhile, contact your supplier on the problem.

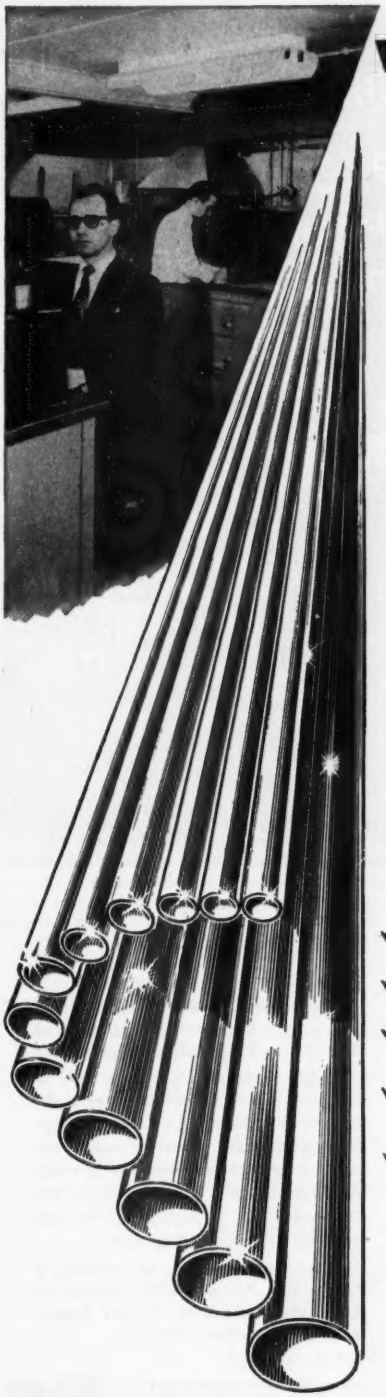
Wishes Cream Icing Formula

Question—Do you have a good formula for preparing a smooth-type butter cream that can be used for icing as well as decorating birthday cakes?

Answer—Cream about 5 min. at medium speed in a beater-type mixer: Powdered sugar, 14 lb.; butter and shortening mix, 6 lb.; whole milk powder, 1¼ lb.; and egg whites, 1¼ lb.

Then melt 3 lb. of butter (about 100 deg. F.) and add to above batch, along with 1¼ lb. of vegetable oil plus vanilla extract. Then cream batch for about 3 min. until smooth.

This butter cream sets with a thin



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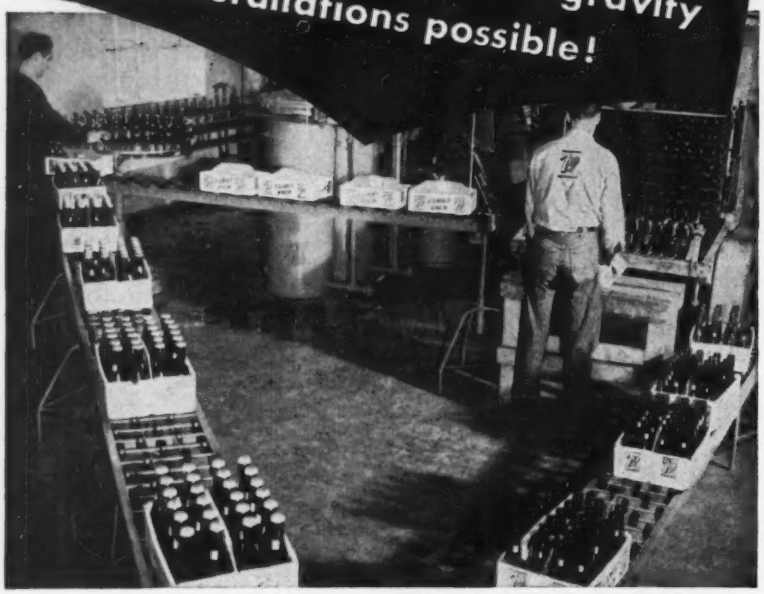

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crust. However, it is light and ices smoothly. If you wish to vary by adding melted bitter chocolate, introduce a little warm water.

To provide this cream with more stability for piping flowers on cakes during the summer months, add 2 oz. of stabilizer dissolved in 1 lb. of water.

To Make Lemon-Pie Filling

Question—Can you furnish me with complete directions for preparing a lemon-pie filling?

Answer—Bring to a boil in a steam-jacketed kettle:

Water, 9 lb.; granulated sugar, 7½ lb.; corn syrup, 2¾ lb.; grated lemon rind, 3¾ oz.; and salt, ¾ oz.

Now mix in separate bowls:

Water, 3 lb.; corn starch, 1¾ lb.; and egg yolks, 1 lb.

Slowly add starch-yolk mix to boiling batch in steam-jacketed kettle. Stir constantly while introducing starch-yolk mix until batch thickens, and then remove from kettle.

At this point, completely fold into batch 1 lb. of slightly beaten whole eggs. The eggs must be slowly added, otherwise lumping will occur. Then separately add 9 oz. of butter and 1½ oz. of fresh lemon juice.

Q.—I've built up a nice little business making farm-fresh dressing products out of freshly-laid eggs. Inasmuch as I do not have a scale, do you know how many medium-size eggs must be broken to make a pound?

A.—We'd suggest that you purchase a scale to accurately weigh the eggs and thus maintain uniform product quality. But to answer your question: Ten medium-size eggs are equivalent to a pound. Also 20 of these eggs will be equal to a quart. To make a quart of whites, 36 medium-size eggs are needed, and it takes 48 for a quart of yolks.

Needs Toffee Formula

Question—There's a dime candy bar that my boss wants me to make—a chewy-type almond nut toffee. Do you have a formula and directions?

Answer—Feed into a steam-jacketed kettle; Butter, 2 lb.; coconut oil (86-96 F. melting point), 2 lb.; corn syrup, 8 lb.; invert sugar, 4 lb.; and condensed milk (sweetened whole), 10 lb. Mix and heat until fats melt. Then add 10 lb. of sugar, stir, and cook to a medium firm ball (254-262 F.). Take from kettle. Add: Salt, ½ lb.; almonds (natural or roasted, whole or broken), 6 lb.; and vanilla flavor, sufficient to suit.

Mix batch well, spread it on cooled oiled slab, level to about ¼-in. thickness, cut into 1¼x3-in. bars just before candy becomes firm, and then wrap in cellophane or waxed paper.—*Formula by California Almond Growers Exchange, Sacramento, Calif.*

Wishes to Make Fudge Topping

Question—Can you furnish us with a formula for a chocolate-flavored milk fudge topping, such as is manufactured by most syrup concerns for serving at soda fountains from a fudge warmer? The product we refer to is a semi-solid paste, until warmed. If possible, we'd like a formula for a topping based on cocoa powder rather than chocolate using fats, milk powder, etc.

Answer—Into a steam-jacketed kettle add: Corn syrup, 67 lb.; sweetened condensed whole milk, 17 lb.; cocoa powder (blend of natural and dutched), 7 lb.; salt, 7 oz.; bicarbonate of soda, 1⅞ oz.; and water 13 lb.

Mix ingredients thoroughly, and then heat, while stirring to 200 deg. F. Hold at this temperature for 15 min., then turn off steam and add sufficient vanilla to suit your taste. Immediately run through a homogenizer, and fill and seal in containers at 185 deg. F.—*Based on formula from A. E. Staley Mfg. Co., Decatur, Ill.*

Q.—Have you any information on yield increases when adding tri-poly, di-sodium, and hexametaphosphates to sausage products and cured, smoked meats?

A.—First off, use of phosphates in sausage products in federally inspected plants has not been approved by the BAI (Bureau of Animal Industry). As for yield, it will average about 1% for short-time smoked items like butts or picnics. Products like bacon or hams that are smoked for longer periods usually show about a 2% increase.

Preparing Fruit Pastes

Question—We'd like to make nut pastes out of dates, figs, and raisins as well as lemon and orange pastes for our variety cakes. Please advise.

Answer—Fig- and date-nut pastes are made the same way. Knead 24 lb. of ground dates or figs with 8 lb. chopped nuts (pecans or walnuts). Add 4 lb. water. Mix until smooth.

To make raisin-nut paste, simply mix 16 lb. ground raisins, 8 lb. chopped walnuts, ¼ lb. ground cinnamon, and 8 lb. water.

Citrus fruit pastes are made by mixing equal parts of sugar with finely ground lemons or oranges.

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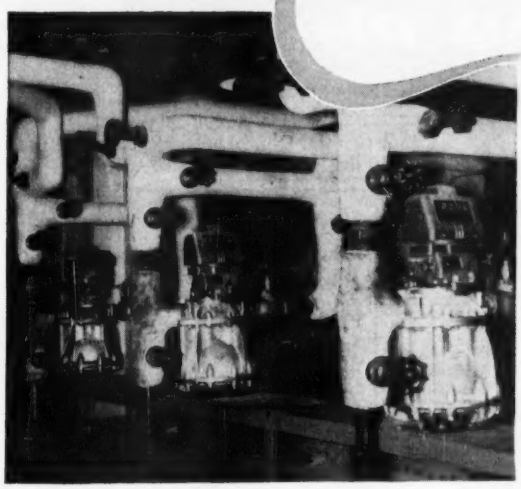

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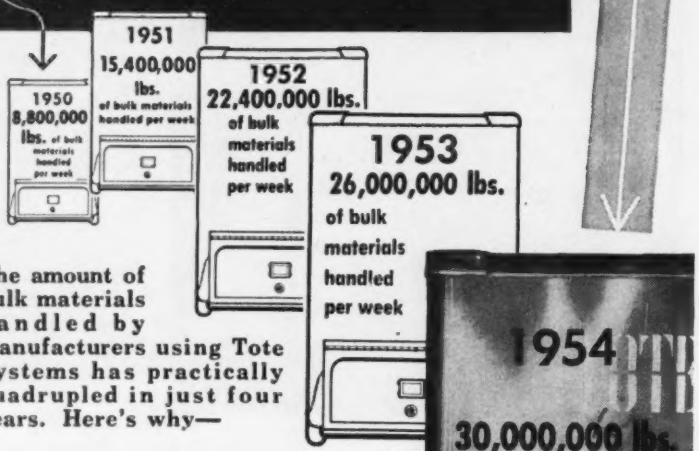
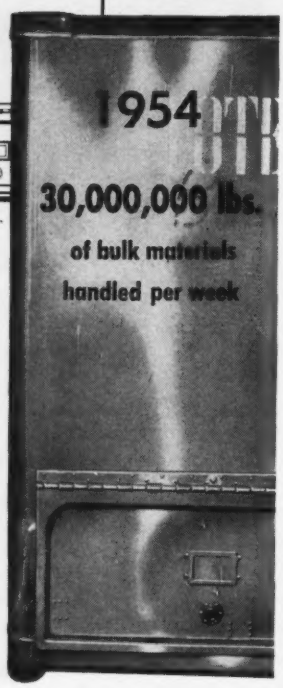

1950
8,800,000 lbs. of bulk materials handled per week
1951
15,400,000 lbs. of bulk materials handled per week
1952
22,400,000 lbs. of bulk materials handled per week
1953
26,000,000 lbs. of bulk materials handled per week

The amount of bulk materials handled by manufacturers using Tote Systems has practically quadrupled in just four years. Here's why—



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Brewers Dried Yeast

—*Continued from page 52*

the hop bitter substances adhering to the yeast cell walls, the slurry is treated with a mild alkali solution under agitation. This step is just long enough to saponify and loosen up the hop resins. As soon as possible, the slurry is pumped, at a 1,500 gph. rate, to a centrifuge where water and saponified resins are separated from the yeast, which then is pumped to a rinse tank for removal of the alkali solution. Diluted slurry again is centrifuged.

Depending upon the degree of bitter substances in the original yeast and the blandness desired in the dried yeast, this alkali treatment may have to be repeated once or twice more, each time followed by centrifuging and water rinsing until all residual alkali has disappeared.

Now that proper blandness is achieved, the yeast is ready for drying. The yeast slurry is pumped between steam-heated revolving drying drums, with flow controlled by a liquid-level regulator. Hourly capacity of each double drum dryer is 375-400 lb. of dried yeast (6-7% moisture). Stainless steel cylindrical drying drums, a few thousands of an inch apart, turn toward each other at 4-18 rpm.

Dried yeast is scraped from the drums by stationary steel knives running along the length of both drums. It then drops into worm-screw conveyors that feed the pulverizer, which can be set for different fineness of granulation, depending on requirements of the food being made.

Yeast is packed in polyethylene-lined, multi-wall kraft bags.

End (*Resume reading on page 53*)

Canning Sweet Potatoes

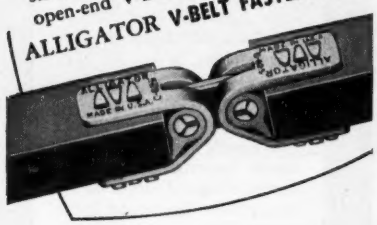
—*Continued from page 68*

Canned freshly dug sweet potatoes have a drained weight of 23.24%; cured 6.10%; cured and stored two weeks, 3.10%. There is no gain in those cured and stored for four weeks. Soluble solids of the group vary from 32.4% with canned uncured potatoes to 35.5% with potatoes cured and stored for two weeks.

Most marked difference is in texture. Force in grams required to crush potatoes canned uncured, is 194.19; for freshly cured, 108.1; two week old, 65.8; four weeks old, 39.90. Texture remains practically constant throughout rest of 22 weeks.

Yellow color decreases slightly in potatoes during curing and storage,

If the correct size of endless V-Belt is not readily available, or if you have to tear down machinery to install, then the best belt to use is open-end V-Belting fastened with ALLIGATOR V-BELT FASTENERS



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while units of red color almost double during storage before canning.

Freshly dug potatoes with a high moisture content (72.7%) peel easiest in the shortest time. After seven days, both the moisture content and alkali required for peeling decrease, while time and temperature needed rise.

At 21 days' storage, the moisture content continues to decrease, and the alkali required for peeling changes only slightly. After 45 days' storage, the moisture content continues to decrease and lye needed for peeling and the difficulty of peeling greatly increase. Also, alkali used for peeling varies with the size of the potatoes, and whether they are freshly dug or cured is a further factor (Table III).

Results show: (1) That potatoes peel easiest with lye when freshly dug, and that peeling difficulties increase with length of storage and higher storage temperatures; (2) amount of alkali required for peeling freshly dug potatoes is high, decreasing as the peel becomes slightly thinner due to drying of storage potatoes, but increasing markedly as peel gets hard.

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The above feature was abstracted from the paper, "Canning Sweet Potatoes," which will be published as Technical Paper No. 266, Journal Series, Georgia Expt. Station.

End (Resume reading on page 69)

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PSYCHOMETRIC METHODS. *Second edition. By J. P. Guilford. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd. St., New York 36. 1954. 597 pages. 6¼ x 9¼ in., cloth. Price: $8.50.*

Revamped to include new chapters on recent advances in psychometry, this second edition is of great value to the food processor.

The up and down method, the quantum method, the fractionation and multiple-stimulus methods, the method of bisection, the constant sum method, and the method of successive categories, are discussed fully and authoritatively. Among new subjects treated are multi-dimensional scaling, objectivity of judgements, and prediction of choice.

Emphasis throughout the book is on unity of all methods.

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Starch Manual

STARCH AND ITS DERIVATIVES. *Third Edition. Vol. I and II. By J. A. Radley. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 1954. 510 pages. (Vol. I), 465 pages (Vol. II). 6 x 8¾ in., cloth. Price: 10.00 each volume.*

This work is directed at keeping those interested in starch and its derivatives abreast of technological advances in the field. Revised for a third time, it is offered now with added chapters and revamped data.

Volume I covers the reactions and structure of starches, and analyses and their action on starch. Each chapter is a monograph by an authority in the particular field. Illustrated with photographs and charts, the chapters include exhaustive references.

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Guide to Good Water

WATER CONDITIONING FOR INDUSTRY. *By Sheppard T. Powell. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, 1954. 548 pages. 6⅜ x 9¼ in., cloth. Price: $9.00.*

Of major importance in the food processing field, quality water usually depends on effective and thorough treatment with a wide variety of equipment. Specific methods and apparatus are described in this book in detail, with complete information on design features, control, installation, and operation.

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Pamphlets and Booklets

FLOW OF BULK SOLIDS (*Bulletin 64*) *by Andrew W. Jenike. Published by Utah Engineering Experiment Station, University of Utah, Salt Lake City. 43 pages, paper. No charge.* Discusses flow of bulk solids in bulk handling systems and in bins.

SUMMARY OF TREATMENT METHODS FOR SLAUGHTERHOUSE AND PACKINGHOUSE WASTES. (*Bulletin 17*). *By Donald D. Gold. Published by Engineering Experiment Station, University of Tennessee, Knoxville. 52 pages, paper. No charge.* Illustrated bulletin covers recovery and treatment of wastes.

HANDLING EMPTY APPLE BOXES. (*Marketing Research Report 71*). *Published by USDA, Washington, D. C. 36 pages, paper. 30¢.* Illustrated booklet deals with Pacific Northwest packing and storage houses handling of empty apple boxes.

LOSSES IN AGRICULTURE. *Published by USDA, Washington, D. C. 190 pages, paper. No charge.* Report by committee of researchers on their survey of crop and livestock production specialists.

QUALITY AND STABILITY OF CANNED MEATS. *Published by Quartermaster Food & Container Institute, Chicago 9. 135 pages, paper. No charge.* Proceedings of a symposium held in Chicago, 1953.

STANDARDS AND TYPICAL SPECIFICATIONS FOR DEAERATORS AND DEAERATING HEATORS, *3rd Edition. Published by Heat Exchange Institute, New York 17. 11 pages, paper. Price $1.00.* Revision of earlier booklet.

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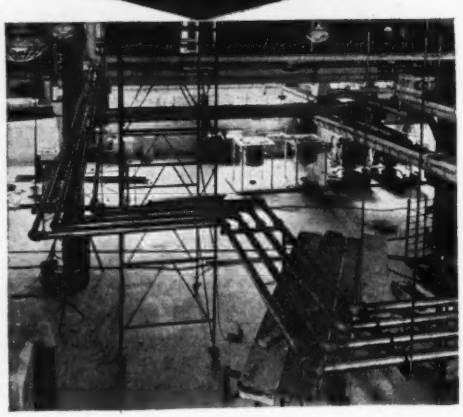

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Tracers on Milk Making

Through research with radioactive tracers, Oak Ridge, Tenn., scientists are now seeking answers to a number of questions concerned with milk.

Studies will investigate how the mammary gland of a cow concentrates calcium 14-fold in milk as compared to that in blood; by what means this gland can use blood constituents in synthesis of new substances common to milk but not found in blood; and what regulates the process by which a cow uses minerals from her own skeleton when demands are in excess of the amount furnished by her diet.

Thus far, research has been confined to radioactive calcium, fed to cows in gelatin capsules or by solutions injected intravenously. Plans now are being made to use radioactive carbon and phosphorus, also.

Another Iodide for Salt

Promise is seen for use of the more stable cuprous iodide as a replacement for potassium iodide as the additive in goiter-preventing salt.

Initially, the change would be made in salt-licks for farm animals. There has been a tendency for potassium iodide to leach out of the licks and decompose. But the cuprous form is insoluble in water.

However, any change in table salt for human consumption would come only after exhaustive tests with the animal type.

The investigations are being conducted at Armour Research Foundation of IIT, Chicago under sponsorship of the Morton Salt Co.

Dairy Purchases Down

The quantities of three dairy products—butter, cheese, and dry milk—bought by CCC under the price support program were approximately 38% lower in Aug. 1954 than in the same month of 1953.

Specifically, purchases: Butter, 13,441,346 lb.; cheese, 16,976,783 lb.; nonfat dry milk, 45,394,495 lb.

Distribution and sales during August totaled 23,752,515 lb. butter; 12,022,370 lb. cheese; 105,642,158 lb. dry milk. Of the latter, 73,980,147 lb. were sold for poultry and livestock feed.

Roundup on Food-Chemical Questions Gives Status Prior to New Congress

Recap of the complex chemicals-in-foods picture is pertinent in this period following adjournment of the 83rd Congress and prior to convening of the 84th in January.

For the many questions involved bid fair to spark both talk and action for the next several months, and perhaps years.

Report on Chemicals

New data for future technical and political discussions should be available soon. These will be in the form of a "useful index" of the chemicals actually being used in foods. The survey has been under way for a couple of years, directed by the Food Technical Subcommittee of the Food Protection Committee.

Although the preliminary report by this group has been completed, present outlook is that only a summary of the report will be prepared and released soon, because there are said to be some gaps in the survey.

Artificial sweeteners are among the chemicals currently in the spotlight. Both saccharin and Sucaryl have been examined by a National Research Council special and temporary policy committee on use of artificial sweeteners for special dietary purposes. The committee's report and recommendations are now being drafted.

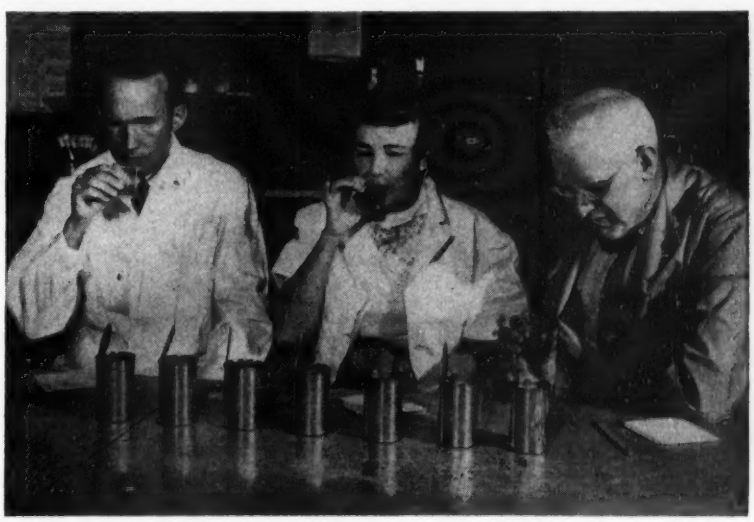
Vitamin and mineral products may soon come into the official spotlight. FDA has requested Food & Nutrition Board for a policy statement on the desirability of establishing definitions and standards of identity to eliminate confusion in consumers' minds.

Other FPC Projects

Guiding principles for use of chemical additives have been prepared in written form by the Food Protection Committee. One of the FPC current projects, however, is the redrafting of those principles to bring them up to date and in line with current thinking.

Packaging materials that are in contact with foods will probably be the subject of the next investigation by the Food Protection Committee. This

(*Turn to page 250*)



Antibiotics as Food Preservatives?

Possibilities of various antibiotics as food-preservation aids continue to be researched at the laboratories of American Can Co., Maywood, Ill. These taste-panelers are evaluating canned tomato juice to which the antibiotic, subtilin, has been added. While no substance promising to supersede the conventional type of heat sterilization has yet been identified, hopes are entertained for discoveries helpful in the preservation of at least some canned products.

Best-Process Award Competition Open for Entries

Entries in the competition for the 1955 FOOD ENGINEERING AWARD—for outstanding achievement in food processing—may be submitted now.

The deadline is January 15, but it is advisable to send in entries well ahead of that date. Then there will be time to supply more information if additional facts are needed.

Nomination of a novel or improved food process for the Award may be made by anyone. And information by which the Award Jury can evaluate the process will be submitted by those entering the competition.

Information about the process should be sent to the Editor of FOOD ENGINEERING, 300 W. 42nd St., New York City 36, N. Y. The editor, who serves as a non-voting secretary to the Award Jury, will pass the information along to the Jurors. One copy of the information is required for each member of the Jury and one for the files, a total of 16 copies. Mimeographed sheets, with photostats of illustrations, are adequate. "Fancy" presentations are not necessary.

The Award Jury is appointed by the Institute of Food Technologists, and its members are leading food technologists connected with colleges and universities.

The best information to submit is a technical description of the process, accompanied by a flow diagram, and pertinent photographs and charts. Explanations of the following should be included:

1. How the process came to be developed, what food company first put it into successful commercial operation, and on what date.

2. The steps by which the process was developed, and what agencies or companies were involved.

3. The success, both technical and economic, which it has achieved.

4. An evaluation of its significance in food processing now and in the years ahead.

This Award is for an improved or novel process, not for a food product itself. And the Award will be presented to a food company, not to an individual person or to an equipment manufacturer. Its purpose is to encourage food processors to develop or to adopt new and better processes.

The process must be in commercial use prior to Jan. 1, 1955, and shall have been put to such use subsequent to Jan. 1, 1950.

The Award, which constitutes a large bronze plaque, will be presented at the next annual meeting of the Institute of Food Technologists in Columbus, Ohio, June 12-16, 1955.

British Variety Bulk-Flour Truck

Built for a miller in Stockport, Cheshire, this special bulk-flour carrier is seen being previewed at recent Royal Lancashire Show in Blackpool. All-aluminum, it's mounted on a Leyland "Octopus" chassis. Incorporated is a system for blowing load of 12½ tons of flour directly into bakery bins at heights up to 100 ft. Report describes air "percolating" through a porous medium in the bases of three longitudinal troughs that incline toward rear of truck, thus causing flour to flow into two feeders for pneumatic delivery at about 20 tons/hour. Vehicle's 125 hp. engine powers installation. (Eastern Publishers Service photo)

Slate Fish-Flour Trials

Test of fish flour is now scheduled in four Latin American countries—Ecuador, Chile, Mexico, and Peru—states the United Nations Children's Fund, New York City.

The Fund has been working with the Food & Agriculture Organization in development of the flour, seen valuable in affording a protein supplement in child-feeding.

Make New T-J Powders; Vac-Dry Methods Noted

Stable and tasteful tomato-juice powders have been developed at Western Utilization Laboratory, USDA, Albany, Calif. Closely followed is the technique employed in making orange and grape juice powders.

Two methods of vacuum drying are reported. In one of these, concentrated tomato juice is directly dried, with air being mixed into the concentrated juice prior to drying. This causes puffing of the product into a sponge-like form. It is then pulverized to a fine powder and canned with a drying material.

In a further two-step technique, pulp is vac-dried, ground to a fine powder, then blended with the powder from the juice.

Progress also is noted in making tomato powder by spray drying. Though more difficult to reconstitute, this material has been found satisfactory for use in dehydrated soups and similar products. And it is termed less expensive.

College Dairy Contest Draws Many Teams

More than 100 students, comprising three-man teams and alternates representing some 25 schools, are expected to take part in the 20th Collegiate Students' Dairy Products Judging Contest at Atlantic City, N. J., Oct. 25.

Contest is sponsored jointly by the American Dairy Science Assn. and Dairy Industries Supply Assn. as part of the 19th Dairy Industries Exposition, Oct. 25-30.

Five silver cups will go to highest scoring teams, plus 15 medals to individual place winners. The five contests are: All products, butter, cheese, ice cream, and milk.

Moreover, four grants (for a year's study in dairy industrial colleges) will go to the highest scoring teams. Faculty members will select representatives of these teams to study under the grants.

Weight & Measure Topics: Milk Tanks, Packages

Testing of farm milk tanks, also standardization of packages for prepackaged foods, came in for attention at the recent National Conference on Weights & Measures in Washington, D. C.

One session was devoted to a demonstration of tank testing, and papers were presented on the subject. Later came adoption of the recommendation by the Standing Committee on Specifications & Tolerances calling for revision and final adoption of the previously tentative code for farm milk tanks.

As for standardization of packages, the Committee on Legislation felt it best to work out a program with the individual industries, hence there was no overall recommendation on prepackaged commodities.

Hors d'Oeuvres

▶ Go automatic or be left behind in this fast-moving technical era, warns a prominent instrument engineer. Which means that engineers must work harder so workers can take it easier.

▶ A great cathedral has been carved from the ancient Zipaquira salt mine in Colombia. This will serve a happily different psychological purpose than the salt mines of Siberia.

▶ Instead of putting up a big illuminated sign across the East River from United Nations, National Sugar Refining Co. contributed $2,500 to beautify the waterfront. The "New York Times" sized it up in three words: "Sweetness and Light."

▶ Foster D. Snell, Inc., is researching a process for making detergents from sugar. Wonder what happened to the boys who were going to make food from chemicals?

▶ It is calculated that 21.5 trillion U.S.P. units of vitamin A were obtained from margarine last year. And no charge for prescriptions.

▶ Officers of a Louisiana growers union have received fines and suspended jail sentences for antitrust law violations. They fixed strawberry prices to processors and enforced other terms by picketing, boycotting, and violence. Seems the strawberry business broke out in a rash.

▶ Americans like to abbreviate names to initials, as in FDA. Brazilians go the other way. For instance, when they spray a place with a well-known insecticide, they "dedetizar" the joint.

▶ A Netherlands scientist believes grass-juice protein has possibilities in human nutrition. If he ever tried to grow a good lawn, he'd realize that grass takes more out of you than it could ever put back.

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Plan Food Safeguards in Event of War

Top officials in the Department of Agriculture, on delegation from the Federal Civil Defense Agency, have begun an appraisal of the steps that should be taken to protect the U.S. food supply in case of enemy attack.

Their study will involve possible defenses against diseases, pests and chemicals that might be used in wartime against animals and crops. It will be set up within the framework of the USDA's Agricultural Research Service.

Coordinator of the work will be Dr. Frank Todd, who has joined USDA after serving as veterinary consultant to civil defense officials. ARS division chiefs will work with him in setting procedures for research, diagnosis, strengthening of defensive barriers, and control and eradication of disease.

While Agriculture's responsibilities extend to processed meat and meat products, they do not cover those processed food products whose control normally is in the hands of the Food & Drug Administration. Responsibilities of FDA and other agencies within the Health-Education-Welfare Department were not delegated in the current civil defense order.

Agriculture officials see the prime danger to the country's wartime food supply as coming from such fast-spreading, virus-caused diseases as hoof-and-mouth disease or rinderpest (diphtheritic inflammation of cattle). Virulence of these diseases is of such degree that care must be exercised in assuring quarantine measures adequate to curb any "new virus mutations" that the enemy might develop.

While all USDA research installations will have a part in future work, a center of activities will be the new animal disease laboratory, located on Plum Island, 2½ miles off the northeastern tip of Long Island.

Research on a small scale began last July on the vesicular diseases—hoof-and-mouth, stomatitis (mouth inflamation), and exanthema (disease marked by eruptions). The work currently is being carried out in a converted army building, until larger facilities now under construction are complete.

Sanitarians Map Subjects

Eight pertinent sessions highlight the program for the Convention of Food Industry Sanitarians, scheduled Nov. 3-5 at the Statler Hotel, Los Angeles.

Brief of the topics: "Audio-Visual Aids in Plant Sanitation," "Sanitation in the Brewing Field," "FDA's Posi-

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To Choose Best Packages

Competition for package designs of '54 is announced by Package Designers Council, which will present its Irwin D. Wolf Award for the best American package or packaging program.

All those directly concerned with developing and making packages may enter.

Entrants are to submit actual 3-dimensional packages that have been on the market since Oct. '53. Of seven industrial classifications, a specific category is food items. In addition, general entries are open under these heads: Coordinated packaging program, redesign projects, packages for new products, and gift packages.

Entries must be received at Council headquarters (66 W. 38th St., N.Y.C.) no later than Nov. 22, accompanied by an official entry blank (available from Council). Fee is $5.50, plus a hanging fee of $15 for each exhibit.

Briefly . . .

• DISTRIBUTING divisions of Consolidated Foods Corp., including Monarch Finer Foods, Sprague Warner, Royal Blue Stores, also Consolidated Food Processors, a subsidiary, will be served by a new 570,000-sq. ft. plant to be erected at River Grove, Ill. Operations are to be coffee roasting, spice grinding, packing of teas and extracts, also handling of fresh fruits and vegetables and frozen foods.

• VITAMIN ASSAYS of foods in various countries will be studied with a view to standardization at international level. Group launching work is Vitamin Commission of Food Divison of International Union of Pure & Allied Chemistry. American member is Dr. Bernard L. Oser, director, Food Research Laboratories.

• SWEET CONCORD grape wine production reached an all-time high of over 10,000,000 gal. for the fiscal year ending Aug. 31, states H. A. Markus, president of Mogen David Wine Corp.

• MILK for school children is being supported by a fund ranging to $50 million in the new government farm program.

• NEED FOR ENGINEERS has brought Corn Products Refining Co. to contribute a four-year $2,400 scholarship program at Illinois Institute of Technology.

Aseptic Process Machine For Glass; Milk Angles

Now nearing completion is the first aseptic canning unit designed to use glass containers. And according to the project sponsor, Glass Containers Manufacturers Institute, preliminary trials of the equipment have been very promising.

The machine is to go to a San Jose, Calif., canning plant, where it will undergo commercial tests.

Meanwhile, special interest has been shown in aseptic canning of milk by Foremost Dairies, Inc. This organization recently acquired the properties of International Milk Processors, Inc., which had been furnished with four aseptic-type machines by James Dole Engineering Co., developer of the Martin aseptic canning process.

Furthermore, both the U. of Wisconsin and Eastern Regional Research Laboratory of USDA are using Dole equipment in tests aimed at development of new products having possibilities for easing the milk-surplus problem.

Favors Color Easement

Food & Drug Administration has unofficially indicated that it wouldn't be adverse to a change in the law governing certification and use of food colors to give it some leeway of judgment in the use of colors.

As the law stands now, FDA has no choice but to disapprove use if tests show a color harmful at any usage level. The "quantitative safe level" concept now under discussion for food additives is considered a good model.

Possibility of requesting such a law change is believed one reason that top Health-Education-Welfare officials have delayed for several weeks their signing of an order that would completely decertify three FD&C colors—orange 1, orange 2, and red 32 (FE Sept., p. 234).

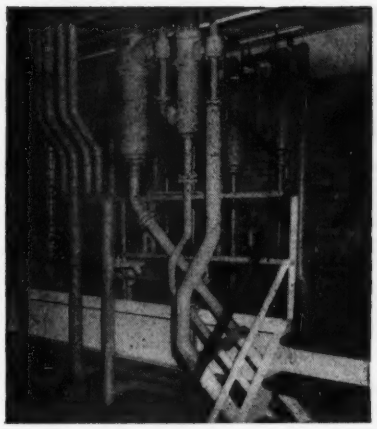
USDA & FDA Standards

Recent Government-agency actions affecting the food industry include the following. References are to issues of the *Federal Register*.

Catsup, amendments by FDA to standards of identity to allow use of corn syrup as an optional ingredient, *F. R.* Aug. 10, p. 5014.

Experimental Packs of standardized foods, revision FDA policy statement, *F. R.* Aug. 11, p. 5052.

Alcohol, revisions of Internal Revenue Service rules, industrial alcohol, *F. R.* Aug. 14, p. 5134; fermented malt liquors, *F. R.* Aug. 18, p. 5221;



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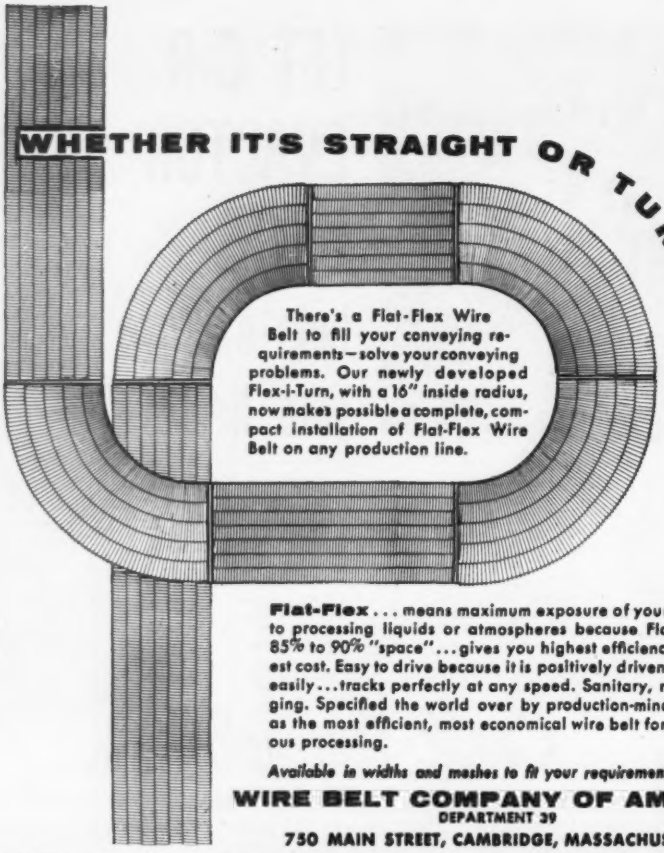
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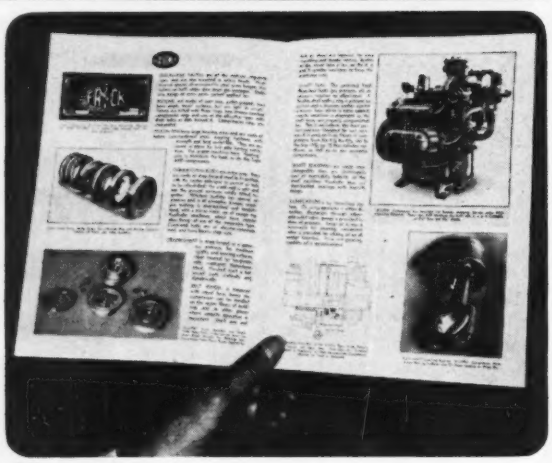

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at rectifying plants and tax-paid bottling houses, *F. R.* Sept. 1, p. 5577, correction, *F. R.* Sept. 10, p. 5865.

Bunched carrots, Agricultural Marketing Service establishment of grade standards, *F. R.* Aug. 18, p. 5202.

Dried apples, AMS proposal for revision of grade standards, *F. R.* Aug. 18, p. 5222.

Dry buttermilk, correction on titratable acidity of AMS grade standard appearing in *F. R.* June 30, p. 3955, *F. R.* Aug. 19, p. 5251.

Pesticide tolerances, assignment to Agricultural Research Service of the certification or exemption from tolerance of Section 408 (L) of Food, Drug & Cosmetic Act (Miller pesticide amendment), *F. R.* Aug. 20, p. 5324.

Beans, green and wax, frozen, miscellaneous amendments to AMS grade standards. *F. R.* Aug. 25, p. 5391.

Limeade, frozen concentrate, proposed AMS grade standard, *F. R.* Aug. 31, p. 5562.

Lettuce, revision of grade standards proposed by AMS, *F. R.* Sept. 4, p. 5642.

Army procurement, 135-page revision of procedures, *F. R.* Sept. 9, p. 5676.

Food-Chemical Roundup

(Continued from news page 243)

study will include both flexible packaging materials and linings of rigid containers. The finger of suspicion has not pinned down any specific chemicals.

Food Protection Committee's program may be somewhat accelerated now, because this group once again has an executive secretary. Dr. Paul E. Johnson, formerly nutritionist with Tennessee Valley Authority and Ph.D.

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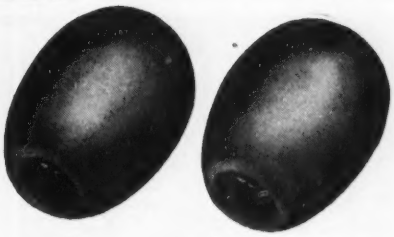

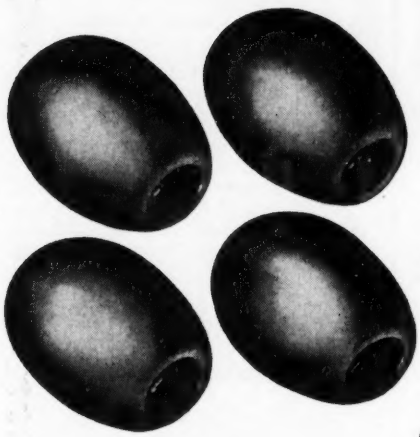

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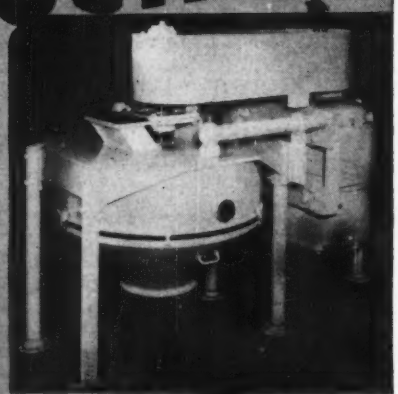

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from Cornell in 1939, joined the staff in early September.

New Heads—Old Policy

FDA has also had two personnel changes recently: George P. Larrick, a chemist and biologist, was sworn in as Commissioner of Food & Drugs on Aug. 12, succeeding Charles W. Crawford, who retired (FE Sept., p. 233). And Bradshaw Mintener was sworn in on Sept. 7 as Assistant Secretary of the Department of Health, Education & Welfare (FE Sept., p. 238).

The latter man comes to Washington from his position as vice-president and general counsel for Pillsbury Mills in Minneapolis. Addition of this food industry man to the administrative superstructure of the Department has been very favorably received.

Promotion of former Deputy Commissioner Larrick, a technical career man, to the top of FDA has also been universally approved. No abrupt change in FDA policy is expected as a result of these changes.

Another Investigation?

Congressional investigation of chemicals in foods may resume next year where the Delaney Committee left off about two years ago. Representative Miller (R. Neb.) has indicated that he may ask for a House Resolution authorizing creation of a new investigating committee.

Reason for a renewed investigation, rather than the holding of hearings on specific bills, was said to be the wide divergence of opinions.

Status of Food Bills

Specific bills will probably be reintroduced promptly in the 84th Congress, convening in January. Representatives Delaney (D., N. Y.) and O'Hara (R., Minn.) both have had chemicals-in-foods bills, in addition to Miller's bill. New language may appear in any of them, since the bills before the 83rd Congress died.

Hearings were held last spring on Rep. O'Hara's bill to prohibit imitation of standardized foods unless a standard exists for the imitation. No report was issued by the Committee, so the bill will have to be reintroduced before the 84th Congress.

Recodification of the Food, Drug & Cosmetic Act passed both Houses of Congress just before adjournment, but it was vetoed by the President. Reconsideration of this subject may come up early in the new Congress.

Regulations are now being written by FDA under which the Miller pesticide chemicals amendment to the Food, Drug & Cosmetic Act will op-

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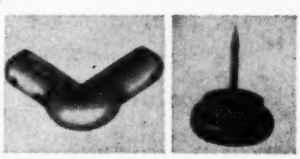

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Schedule of Events

October

9–16—International Dairy Exposition; Union Stockyards, Chicago.

16–20—American Bakers Assn., annual meeting, and Bakery Equipment Manufacturers Assn. (Oct. 17); Hotel Sherman, Chicago.

17–19—Brewers Assn. of America, convention and exhibit; Edgewater Beach Hotel, Chicago.

20–23—National Assn. Retail Ice Cream Manufacturers, annual meeting; Traymore Hotel, Atlantic City, N. J.

21–23—International Assn. of Milk & Food Sanitarians; Hotel Morton, Atlantic City, N. J.

24–30—Milk Industry Foundation, annual convention (to 27th); International Assn. of Ice Cream Manufacturers, annual convention (27-29); Dairy Industries Supply Assn., exposition (25-30, Convention Hall); Atlantic City, N. J.

25–27—Packaging Institute, annual forum; Hotel Roosevelt, N. Y. C.

27—Evaporated Milk Assn.; Madison Hotel, Atlantic City, N. J.

27—National Pickle Packers Assn., annual meeting; Drake Hotel, Chicago.

November

3–5—Assn. of Food Industry Sanitarians, business meeting and conference; Statler Hotel, Los Angeles.

7–10—National Assn. of Popcorn Manufacturers; Hotel New Yorker, Chicago.

8–10—Grocery Manufacturers of America, annual meeting; Waldorf-Astoria Hotel, New York City.

15–18—International Soft Drink Industry Exposition; Convention Hall, Philadelphia.

erate. This deals with the establishment of safe tolerances for pesticide residues on agricultural commodities.

Also of vital interest to all is the new provision for FDA's fixing fees to cover the costs. Since these will have to defray the expenses of advisory committees which may be appointed, the fees might amount to a considerable figure. Effective date of the Miller amendment is July 22, 1955.

Standards Amendments

Hale amendment petitions to amend existing food standards are now five in number, with the filing in August of two petitions to amend the cheese standards. Earlier petitions included the July petition to amend canned vegetables, the June petition to amend fruit butters, jellies, and preserves, and the May petition to amend tomato catsup.

Tomato catsup amendment, permitting optional use of "corn syrup or dried corn syrup or both, in such quantity that the weight of the solids of the corn syrup . . . is not more than one-third of the weight of the solids" of all sweeteners used, is effective Oct. 9. This marks the successful conclusion of the first Hale amendment petition action by FDA.

The fruit jam petition proposes optional use of a variety of anti-foaming agents.

(Turn page)

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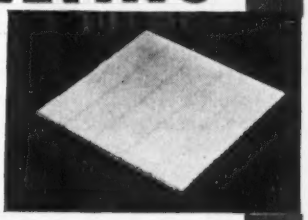

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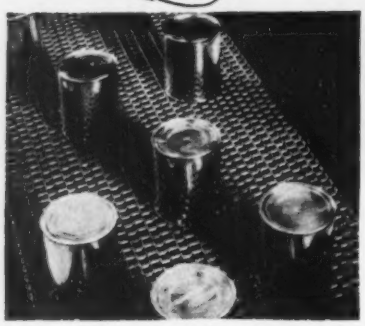

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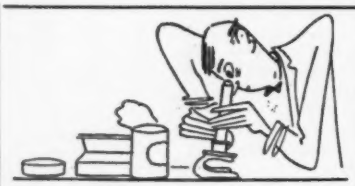

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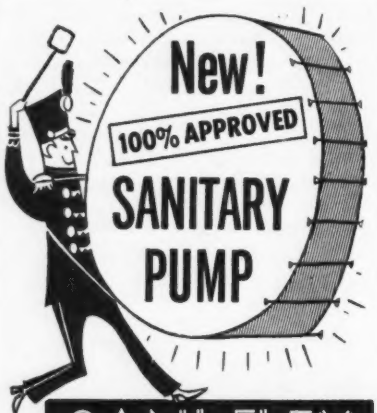

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Canned vegetable amendments, to provide for use of monosodium glutamate as an optional ingredient, were the subjects of the third Hale amendment petition.

Cheese amendments were proposed in the 4th and 5th petitions, both proposing optional use of antimycotic agents to retard spoiling. One was for sodium and calcium propionates the other for sorbic acid.

Forthcoming amendments to standardized foods are often the subject of temporary permits, under FDA's so-called "3.12 permit" system. One recently granted was for tomato juice in concentrated form, for reconstitution with water.

Others have covered use of calcium cyclamate in place of sugar as a nonnutritive sweetener in canned fruits, sorbic acid in cheese wrappers, flavoring materials and starch in canned sweet potatoes, and artificial color in canned green beans.

There are five dockets on which official action by FDA is still awaited under the procedure followed prior to the Hale amendment.

Two of these dockets are over four years old: Frozen fruits, for which a tentative order was published in Oct. 1950, final order awaited; and residue tolerances for pesticides on fresh fruits and vegetables, having had no official action since the hearing adjourned in Sept. 1950, tentative order awaited.

Tentative orders are also awaited for canned pineapple and canned pineapple juice, on which the hearing adjourned in Apr. 1952; and for ice cream, on which the hearing adjourned in Dec. 1952.

Coal-tar colors were the subject of a hearing in Jan. 1954, and a tentative order is awaited covering the proposed delisting of FD&C Orange No. 1, FD&C Orange No. 2, and FD&C Red No. 32 (FE Sept., p. 234).

—*End*—

New Bottling Plant

—*Continued from page 57*

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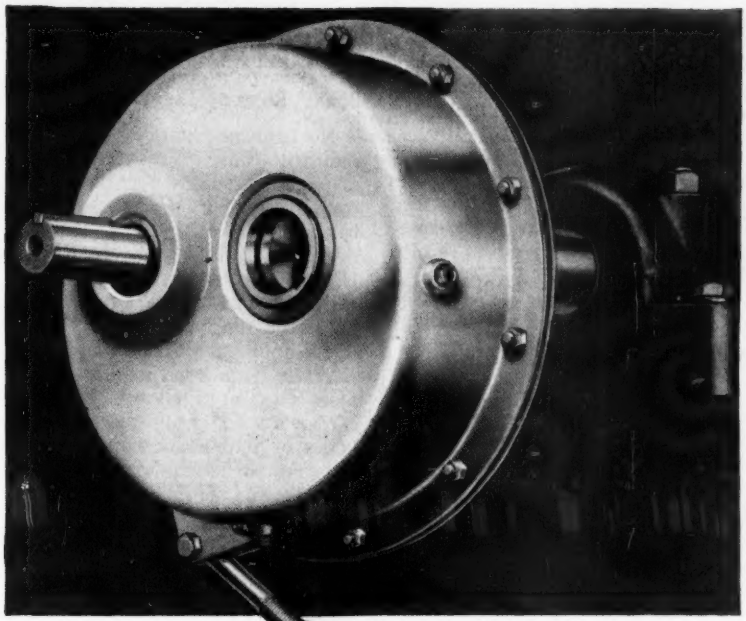

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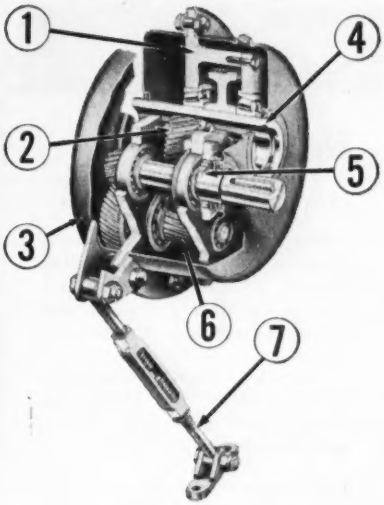

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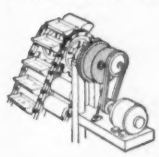

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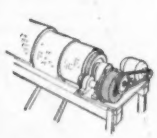

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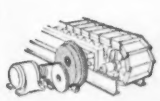
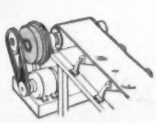


APRON FEEDER



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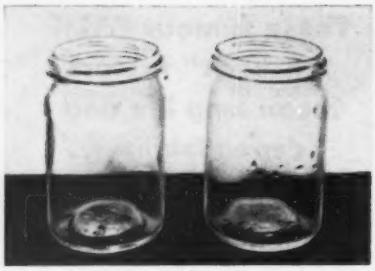

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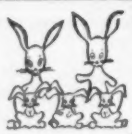

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they are moved to loading stations facing exit doors. These stations provide 12 ft. space between trucks for maneuvering the fork-lift units as they remove pallet loads of empties and replace them with fulls.

When loaded, trucks from stations to the rear are moved into the spaces between those closest to the exit doors. In this way, the 85 ft. space accommodates nine rows of loaded trucks.

End (Resume reading on page 58)

Whole Wheat Grinding

—Continued from page 61

pointer remaining in this red section indicates the motor is overloaded.

Capacity of this 3-hp. mill is 60 lb. of wheat flour per hour. Mill is hopper-loaded with 200 lb. of cleaned wheat grain, and then may be left unattended while operating. It is rated for continuous, 24-hr.-per-day duty, and will not suffer damage if allowed to run idle after the grain is ground.

Contamination of room by flour passing from grinding head to receiving tub is avoided by covering this section with a canton flannel tent.

Floor space taken up by this portable, 67-in. high mill amounts to 36x40 in. With flour tub removed, the narrow dimension shrinks to 27 in.—enough to move the unit through any standard doorway.

End (Resume reading on page 62)

Convincing Bankers

—Continued from page 45

The canner and an accountant could have mapped out the cost of expansion, and anticipated the cash requirements in time for orderly steps to be taken.

Concealing difficulties. A processor of jams and jellies who had a reputation for outselling competition also had a record of always being "into the banks for everything." The banks didn't like it. This processor was simply conducting his business on a borrowing-from-Peter-to-pay-Paul treadmill. Investigation by an accountant revealed that the basic trouble lay in poor pricing practices.

Undercapitalization: A medium-size baking company decided to expand from bread and rolls into packaged cakes. It applied for $10,000 and was turned down. That amount would not be enough to launch the new lines, the bank said, yet the bank would not lend more money. There wasn't enough capital in the business to justify a larger loan.

So more capital had to be raised —from private sources and by setting aside a special fund from earnings over a period of time.

Banks' Rules-of-Thumb

No hard-and-fast rules govern food industry loans. With credit tight, many banks specify that loan applicants carry 20% of the loan in balances.

Interest rates are far from rigid. However, the shopper for better rates will find that lower interest often hinges on the type of loan, the size of the applicant's balance, and so on.

While there is no rigid method of appraising an applicant, banks do employ a series of ratios as rough estimates of your financial position. So it might be helpful to get a picture of where you stand—to measure yourself in the light of these ratios:

Current ratio: Current assets divided by current liabilities. Should be at least two-to-one.

Quick asets to current debt: Cash, receivables, and other ready cash items divided by current debt. Should be at least one-to-one.

Debt to capital: Creditors' money compared to owners' money in the business. The lower the ratio the better.

Fixed assets to capital: Real estate, machinery, equipment and fixtures divided by net assets. Ratio should be kept as low as possible to avoid depleting working capital.

Inventory to working capital: Shows percentage of working capital "tied up" in inventory. Abnormally high ratio may result in shortage of liquid working capital to meet other expenses.

Banks will place greater reliance on your financial statements if they have been audited by an independent certified public accountant. As a matter of fact, such an audit is a prerequisite for most unsecured loans of $10.000 and up.

The auditor's report—containing your financial statements and the auditor's opinion of them—can be submitted in either short or long form.

Whichever form you choose, do not restrict the scope of the audit. Since the auditor is supposed to give his opinion of your statements, it is up to him to decide how far he must go in the examination of your affairs to form this opinion. If you limit the areas of the accountant's investigations, he is required to mention that fact in his report.

Anyway, an adequate audit yields valuable information on the overall conduct of your business. It will help, too, to crystallize your plans for repayment.

End (Resume reading on page 46)

Recent Inventions

PRODUCTS

Pastries Made by Gelatinizing Wheat Flour, Dehydrating, Comminuting. Adding Shortening, Eggs, Aqueous Fluid, Cooking—*A. Kipnis, Forest Hills, N. Y. No. 2,684,302. July 20, 1954.*

Modified Glyceride Fats by Heating Peanut Oil in Presence of Sodium Methylate, Destroying Catalyst With Phosphoric Acid, Adding Acetone-Hexane Solvent, Chilling, Removing Solids—*E. L. Skau, New Orleans, La. to USA. No. 2,684,377. July 20, 1954.*

Winterized Cottonseed Oil by Adding Acetone to Oil-Hexane-Water Solution Containing 40% Oil, Cooling, Removing Solids—*E. L. Skau, New Orleans, La. to USA. No. 2,684,378. July 20, '54.*

Diastatic Malt Flour Containing 10-50% 325 Mesh Sodium Chloride by Weight—*R. W. Selman, Leawood, Kan., and L. F. Marnett, Kansas City, Mo. to C. J. Patterson Co. No. 2,684,904. July 27, 1954.*

Non-Adhering Cheese Slices by Dehydration to Develop Surface Film—*G. E. Grindrod, Oconomowoc, Wis. No. 2,684,906. July 27, 1954.*

Washing and Disinfecting Composition Comprising Mixture of Polyethylene Polyamine, Diethylene Triamine Hydrochloride Compounds—*A. Schmitz to Th. Goldschmidt, A. G., Essen, Germany. No. 2,684,946. July 27, 1954.*

Low Melting, Hard, Brittle Fat by Completely Hydrogenating Natural Free Fatty Acids, Esterifying With Polyhedric Alcohol—*K. H. Imhausen and P. Krieghoff to Imhausen & Co., G.m.b.H., Witten, Germany. No. 2,684,970. July 27, 1954.*

Levulinic Acid Recovered From Aqueous Solution by Extraction With Methyl Isobutyl Ketone—*E. Sherman to Quaker Oats Co., Chicago. No. 2,684,981. July 27, 1954.*

Levulinic Acid Recovered From Aqueous Solution by Extraction With Furfural—*A. P. Dunlop, Riverside, Ill. to Quaker Oats Co., Chicago. No. 2,684,982. July 27, 1954.*

Hard Butter by Heating Mixture of Free Fatty Acids and Glycerine to 450 F. under 25 in. Vacuum, Raising Temperature to 550 F., Increasing Vacuum to 29 in. to Remove Excess Acids—*G. Barsky, New York City and G. Zinzalian, Boonton, N. J. to E. F. Drew & Co. No. 2,685,592. Aug. 3, 1954.*

Antioxidant for Dehydrated Vegetable Material Comprising an Acyl Pyrogallol With Hydrocarbon Radical—*T. W. Campbell, Orinda, and G. M. Coppinger, El Cerrito, Calif. to USA. No. 2,686,123. Aug. 10, 1954.*

Recovering Oil and Protein From Fish by Digesting With Strong Alkali, Separating Layers, Acidifying Aqueous Phase, Precipitating, Washing, Drying—*J. A. Lovern, S. W. F. Hanson, Aberdeen, and H. H. Goodwin, T. H. Wilson, Edinburgh, Scotland. No. 2,686,126. Aug. 10, 1954.*

PROCESSES

High Protein Milk Prepared by Liming Mixture of Casein Curd (20% Solids), Skim Milk and Water to pH 6.0-6.2, Pasteurizing, Drying—*J. G. Brereton, Norwich, F. A. Baldauski, S. Plymouth, and D. H. Borner, Bellport, N. Y. to National Dairy Research Laboratories, Islip, N. Y. No. 2,682,467. June 29, 1954.*

Converting Bound Acids in Wine to Free Acids by Treatment With Hydrogen Exchange Resin Followed by Anion Exchanger—*O. D. Frampton, Wyoming, Ohio, to National Distillers Products Corp. No. 2,682,468. June 29, 1954.*

Bake Pans Delidded on Conveyor by Parallel, Opposed, Endless Belts With Friction Face Attachments to Grip, Transfer Lids to Discharge Conveyor—*E. G. Keller, Harrisburg, Pa., to Stroehmann Bros. Co., Williamsport, Pa. No. 2,683,560. July 13, 1954.*

Fruit Graded for Size in Overhead System That Opens Leaves of Caliper-Cup Article-Carrier—With Finger Contacting Guide Rail Along Endless Belt—*O. B. Hartrampf, Hillsboro, Oreg. No. 2,684,155. July 20, 1954.*

Lettuce Solids Evaluated by Comminuiting, Adjusting to pH 7-8, Blanching, Pressing, Drying—*J. G. Macey, Kentfield, Calif. to Salinas Laboratories, Inc., Salinas, Calif. No. 2,684,903. July 27, 1954.*

Inhibiting Mold Growth in Cheese by Infra-Red Radiation—*G. Grindrod, Oconomowoc, Wis. No. 2,684,905. July 27, 1954.*

Recovering Protein Slurries From Material Containing Vegetable Globulin by Extracting With Caustic, Acidifying to pH 3.5, Adding Alkali to Isoelectric Point, Concentrating by Centrifuge—*H. Taylor, Dumfries, Scotland to Imperial Chemical Industries Ltd., England. No. 2,684,960. July 27, 1954.*

Modifying Protein Hydrolysates by Reacting With Anion Exchanger, Removing Ammonia, Diluting, Re-

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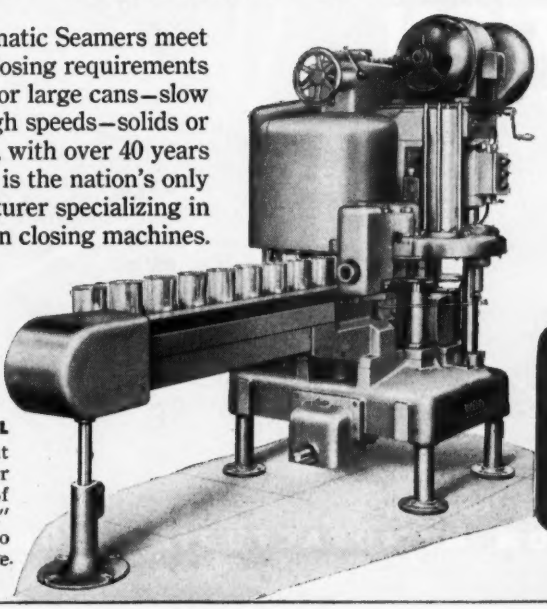
Angelus Automatic Seamers meet any round can closing requirements—small cans or large cans—slow speeds or high speeds—solids or liquids. Angelus, with over 40 years experience, is the nation's only manufacturer specializing in can closing machines.



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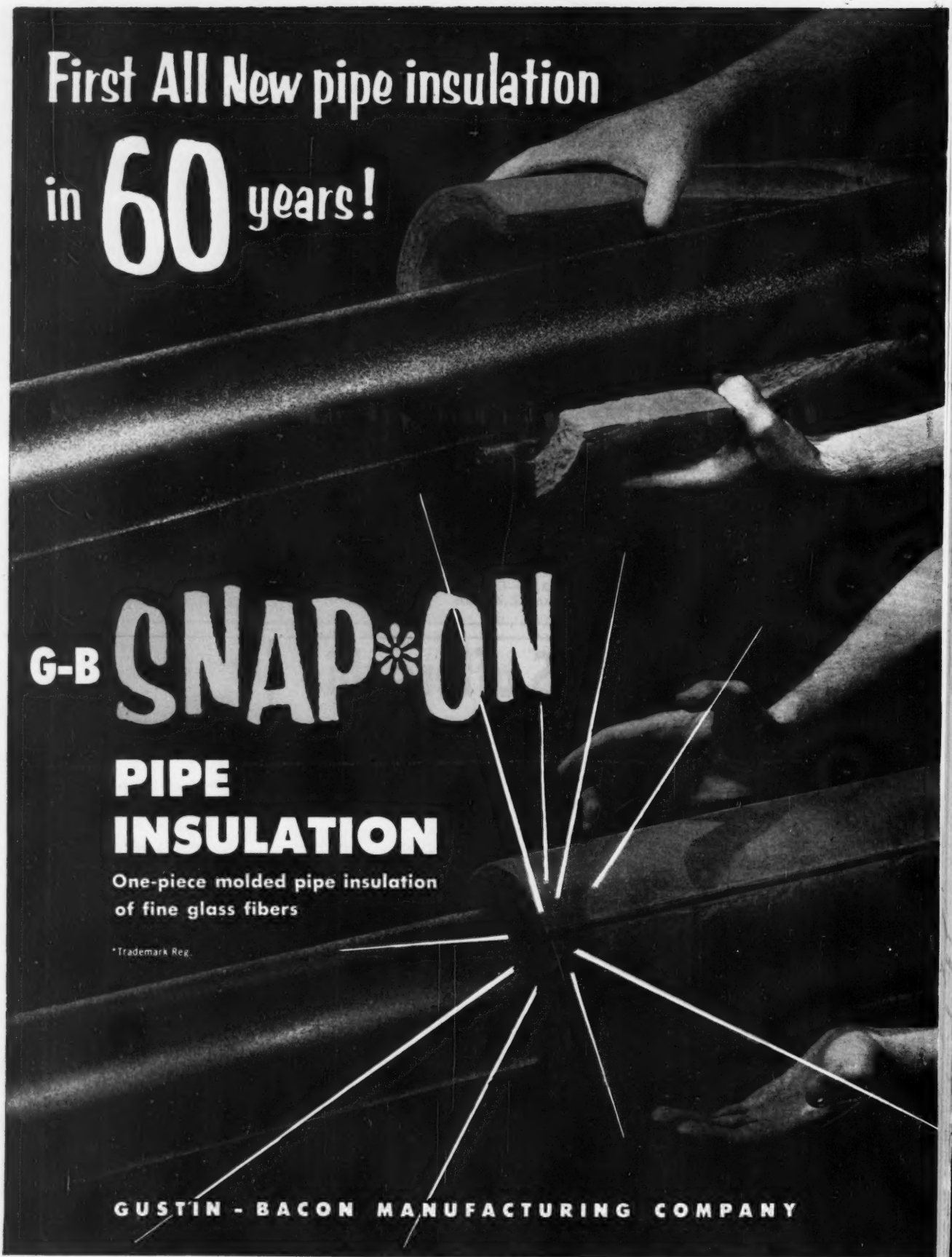
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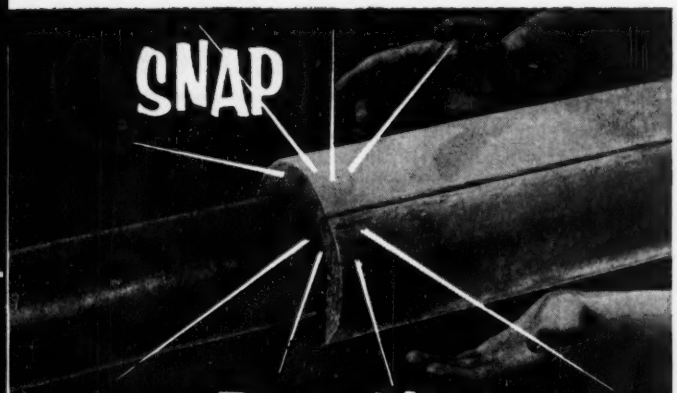

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New G-B Snap*On Pipe Insulation is a one-piece molded pipe insulation of fine glass fibers for hot or cold piping.

SUPERIOR THERMAL EFFICIENCY!

"K" factor is remarkably low — only .23 at 100 mean. ½" of this new material is the insulating equal of many 1" pipe insulations!

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G-B Snap*On is 4 to 10 times lighter than other pipe insulations. It is virtually immune to damage —won't break or crumble when dry, won't get gummy or muddy when wet. It will not shrink, rot, mold or decay.

A SNAP TO APPLY!

G-B Snap*On is flexible and resilient—snaps quickly around piping. The single seam is closed with staples, wire or bands. One man can easily handle lightweight 6' sections. No dust, no coarse irritating fibers. G-B Snap*On cuts easily with any knife. It can be left "as is", covered with canvas, painted or finished as desired. It is available with factory-applied vapor barrier facing for cold piping.

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G-B Snap*On Pipe Insulation, as a material, costs no more than conventional insulations for any given job. Its unusual characteristics make it far cheaper to store, handle, and apply; users report application savings up to 50%!

AVAILABLE IN SIZES ¾" TO 24"!

G-B Snap*On comes in one-piece sections in a complete range of pipe sizes from ¾" to 24", and in wall thicknesses down to ½".

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acting Again With Anion Exchanger—*E. B. McQuarrie, Concord, Calif. to Cutter Laboratories, Berkeley, Calif. No. 2,684,983. July 27, 1954.*

EQUIPMENT

Centrifuge Having Provisions for Separate Discharge of Overflow and Underflow Fractions, Receiving Chambers With Partition Pierced by Rotor—*R. W. Honeychurch, Oakland to Merco Centrifugal Co., San Francisco, Calif. No. 2,681,180. June 15, 1954.*

Refrigerator for Meat Grinders With Coil-Containing Casing to Fit Bottom of Cylinder, Insulated Casing For Top, Tubes and Controls For Refrigerant, and Releasable Fastenings for Casings—*F. H. Stiner, North Hollywood, Calif. No. 2,681,676. June 22, 1954.*

Tote Box Unloading Hopper With Open End to Receive Box, Hopper and Pivot for Dumping With Means for Holding to Receive and Discharge Contents—*L. J. Hawkins, Colden, and C. J. Zimmerman, Kenmore, N. Y. to Honan-Crane Corp., Lebanon, Ind. No. 2,681,746. June 22, 1954.*

Bulk Milk Transporting and Dispensing Apparatus With Vertical, Cylindrical Shape Body, Nipple in Lower Part Communicating to Interior, Said Nipple Enclosed in Housing Having Means for Affixing Seal—*L. F. Norris, D. J. W. Timmersman, and T. L. Sage to Norris Dispensers, Inc., Minneapolis, Minn. No. 2,681,747. June 22, 1954.*

Fluid Measuring and Dispensing Apparatus Consisting of Bottom Vessel With Inverted Fluid Container, Pick-Up Tube Entering Side of Said Vessel, and Manually-Operated Pump—*J. J. Booth, Dallas. No. 2,681,750. June 22, 1954.*

Filling Tube Assembly for Gravity Feed Machine Consisting of Head, Dual-Tube Component for Liquid and Air, Means of Mounting Outer Tube Slidably—*I. H. Risser, Glenview, Ill. to U. S. Bottlers Machinery Co., Chicago. No. 2,681,759. June 22, 1954.*

Hammer Mills Feed Comprising Hopper, Pit, Conduit and Regulator to Provide Predetermined Level of Grain in Pit in Relation to Side Opening for Feeding to Conduit—*C. E. Boucher to S. Vessot Co. Ltd., Joliette, Quebec, Canada. No. 2,681,768. June 22, 1954.*

Vibratory Mixer for Fluids Consisting of Vessel, Reciprocating Shaft and Perforated Mixing Member Designed to Receive Liquid From Conduit, Circulate it Through Mixture—*H. Muller, Erlenbach (Zurich) Switzerland. No. 2,681,798. June 22, 1954.*

Scale Indicator Consisting of Carrier and Guide Surfaces for Keeping Indicator Vertical During Traverse of Chart—*J. F. Bengtsson, New York. No. 2,682,252. June 29, 1954.*

Brocolli Bunching Machine Comprising Receiving Pockets, Means for Forming and Compressing Bundle—*R. M. Magnuson, Campbell, and R. K. Daugherty, San Jose, Calif. to S. D'Arrigo. No. 2,682,288. June 29, 1954.*

Air Purifier With Plurality of Compartments Enclosing Textile Sleeves, Inlet for Dust-Laden Air, Valves for Controlling Operation —*H. J. Kaufmann, Knockholt, England. No. 2,682,316. June 29, 1954.*

Vibratory Feeder Comprising Motor-Vibrated Trough With Discharge End Above and Normal to Longitudinal Axis of Conveyer —*W. T. Isbell, Herculaneum, Mo. to St. Joseph Lead Co., New York. No. 2,682,332. June 29, 1954.*

PACKAGING

Carton Converter Produces Severed Blanks With Scored Folding Lines and Printed Indicia From Continuous Moving Paperboard Web—*C. Z. Monroe and N. G. Raymond, to Ex-Cell-O Corp., Detroit. No. 2,682,208. June 29, 1954.*

Pasting Mechanism for Bag Closing and Sealing Machine Comprising Reservoir, Supporting Arms, Feed Roller, Paste Film Applicator, Doctor Blade—*H. V. Kindseth and F. L. Hopkins, to Bemis Bro. Bag Co., Minneapolis, Minn. No. 2,683,435. July 13, '54.*

Label Picker Apparatus for Conveyed Packages Comprising Picker Blades, Supplementary Picker Lever, Bias Means, Deflecting Member—*M. H. Schiemel, and C. H. Schwartz, to Jos. Schlitz Brewing Co., Milwaukee, Wis. No. 2,683,548. July 13, 1954.*

Packaging Machine Comprising Endless Conveyor, Reciprocating Pusher, Means for Transferring Article from Package Form to Carton—*R. S. Jenney, to Kellogg Co., Battle Creek, Mich. No. 2,683,557. July 13, 1954.*

Air-Operated Bottle-Closing Apparatus With Housing, Turnably Mounted Holder, Means for Applying, Stamping Closure Cap—*J. Staller, Erlenbach, Switzerland. No. 2,683,559. July 13, 1954.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Model TA has *What it Takes* to do TOUGH mixing

DESIGNED FOR EXTRA HEAVY MIXING

AGITATOR PARTS QUICKLY REMOVABLE FOR EASY CLEANING

GROEN
STAINLESS STEEL STEAM JACKETED
TWIN-SHAFT MIXER KETTLE

IT'S A RUGGED, SANITARY UNIT

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- Stainless steel from top to bottom. Completely sanitary — conforms to the most rigid Health Dept. requirements. Twin shaft operation for highest efficiency in mixing. Fully enclosed motor drives two shafts: (1)—at slow speed operating Flexible Finger-Like scrapers; and (2)—a secondary high-speed shaft equipped with any of a variety of beaters, blenders or mixers.

- Demountable shaft couplings permit entire agitator assembly to be removed in a few seconds for easy cleaning, and as quickly reinstalled. Cannot disengage in operation. And couplings equal strength of a solid shaft. Read all about this widely famous mixer in Bulletin AK-2. Write for it now.

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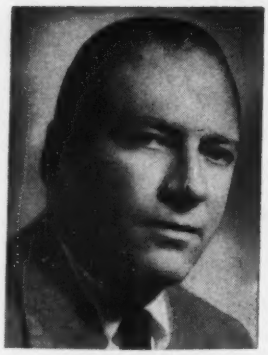
Men & Companies



Harry A. Trimm, Jr., has been appointed fisheries product manager for the Birds Eye Division of General Foods, and will be responsible for marketing of the entire line of frozen seafood products.

Industry

Adams Potato Chips, Inc., Lansing, Mich., has been incorporated for $150,000 to manufacture and deal in potato chips and allied products.

Akron (Ohio) Standard Market Co. has started construction on a $300,000 two-story frozen food plant.

Amboy Milk Products Co. has appointed L. S. Griffith, former board member, to be its new president, and Mr. William Aldorfer as general manager of co. operations.

Atlantic Sugar Refineries Ltd., Montreal, is planning a $2¾ million plant expansion program.

Baby Formulas, San Francisco, is reported opening its new $160,000 plant Oct. 1.

Bay Springs Poultry Co., Bay Springs, Mass., has been organized with capital stock of $60,000.

Berg, Zuckerman & Assoc. have formed an engineering and consulting organization and will design, erect, and begin initial operation for plants serving the soluble coffee industry.

Bon Ton Beverages, Inc., Waukesha, Wis., and **Mammoth Spring Canning Co.,** Sussex, Wis., have combined forces to produce canned soft drinks.

Campbell Soup Co. is building a 800,000 sq. ft. one-story production plant estimated to cost about $20 million at Napoleon, Ohio.

Can-A-Pop Beverage Co. is closing its Sheridan works and will move to a new location in the Denver area.

Casanova Chocolate Co., Inc., is reported opening a new factory in Milford, Conn., for production of more than 300 varieties of chocolate candies.

Commonwealth Foods, Inc., coffee roasters in Manila, are building a new soluble coffee factory in the Philippines, to be constructed by Heyman Process Corp., consulting engineers in Brooklyn.

Dole Hawaiian Pineapple Co. will build a new plant in Honolulu estimated to cost more than $3 million for the manufacture of its own tin cans.

Flavor Laboratory of Arthur D. Little, Inc., has announced the appointments of Dr. Charles M. Apt and Miss Margery A. Terwilliger.

General Foods Ltd., Toronto, has named Anthony Z. Pengelly and Donald McCatskill as new product managers to direct marketing of Jell-O; and Postum, Walter Baker Products and Swans Down cake flour respectively.

Hanline Poultry Co., Charlotte, N. C., has been organized with capital stock of $100,000.

Henry M. Winter has been elected executive vice-president of Pepsi-Cola International. He is continuing as member of the board.

Joseph M. Waters is new executive vice-president of Snow Crop Division of Clinton Foods Inc., while retaining his present position as vice-president and officer of the company.

Intercontinental Packers Ltd., has recently established a new sausage kitchen in Saskatoon.

John Labatt Ltd. is building a $6.5 million brewery in Montreal, with annual capacity of 250,000 bbl.

Lake Byrd Citrus Packing Co. is constructing a new fresh fruit packaging works at Avon Park, Fla.

London Bottling Co. has purchased the entire assets of Orange Crush Ltd. in London, Ont.

McAdam Dairy Products Corp. has opened a cottage cheese processing and cupping unit factory in Cohoes, N. Y.

John Morrell & Co. has purchased control of three meat plants: Tobin Packing Co. of Estherville, Iowa, Roberts & Oake, Inc., Madison, S. Dakota, and a meat processing plant at Chicago.

Planters Nut & Chocolate Co., Ivor, Va. has begun work on a purchasing, inspection and storage station to be completed Oct. 15.

Pluss-Tex Poultry Co.'s Lufkin, Tex., plant has gone into operation with plans to process 16,000 broilers daily.

Red Deer Brewing Co., Ltd., Red Deer, Alta., has opened its $1,500,000 brewery, under construction for the past three years.

White Rock Beverage Co. of San Francisco has been purchased from William Fleishbacker by a group headed by Philip J. Twohy, Jr., and W. A. Ryan who became new president and vice-president respectively.

Personnel

Joseph W. Barclay, specialist in quantity food preparation and former supervisor of food and beverages for Roger Smith Hotels Corp., has been elected vice-president of manufacturing for Frigidinner, Inc.

E. M. Brown, former chief chemist and chief wine maker for Italian Swiss Colony, is new technical director for Calif. Grape Products Corp.

Whitney Drayton, chairman of the Management Committee of Hunt Foods, Inc., was elected company vice-president.

Louis A. Fischer of St. Louis, formerly consultant for Campbell Soup Co., is new plant manager of Redi-Foods, Inc., Salt Lake City.

A. W. Gordon, Omaha businessman, was appointed a director of Fairmont Foods Co.

G. A. Latremouille, manager for Catelli Food Products Ltd., Montreal, has been made manager of the firm's new Ontario plant.

Allen B. Morgan is new director of Continental Baking Co., New York City.

Paul M. Porter has been appointed manager of all company operations for Blue Bird Potato Chips, Inc.

Robert K. Porter is new vice-president and general manager of Thomas J. Lipton Ltd.

William F. McLean has been appointed president of Canada Packers Ltd. to succeed his father, the late J. S. McLean.

Adolph H. Rosenberg has been elected a director and chairman of Twentieth Century Foods Corp.'s Finance Committee, Springfield, Mo.

Wilbur W. Strottman, previously master for Uchtorff Brewing Co., Davenport, Iowa, is new master brewer of Oshkosh Brewing Co., Oshkosh, Wis.

John A. Valentine is new manager of the Norristown, Pa., plant of 6-O'Clock Foods, Inc.

J. S. VanderHeide is new director of Food Industries Div.,

REAL SAVINGS

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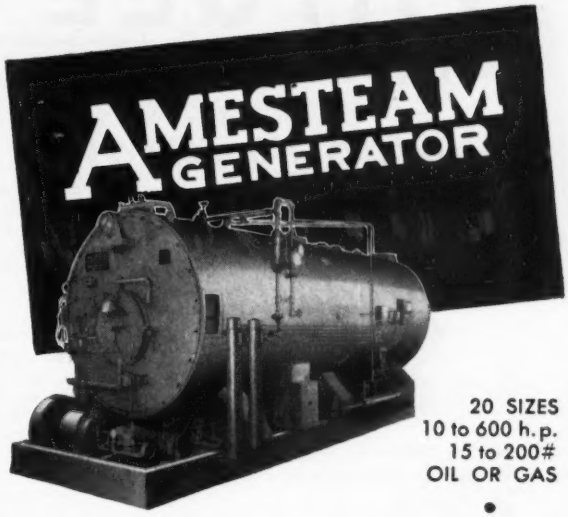

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COMPLETE SERVICE! Our LOCAL service man starts your unit and gives you three months' FREE service.

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(WHEAT STARCH)

leaves no cereal taste to mask your products own fine flavor!

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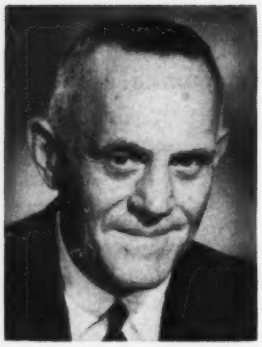

James A. Ryan, member of the Advisory Committee of the Institute of Shortening and Edible Oils, Inc., becomes new president of C. F. Simonin's Sons, Inc., Philadelphia firm which refines and sells edible oils and markets salad and cooking oils under the Yolanda, Seazo and other brands.

Business and Defense Services Admin., U. S. Dept. of Commerce.

Associated Industries

American Can Co. has broken ground for a $2.5 million addition to its San Francisco facility, and also set up a wholly-owned subsidiary to take over activities in Hawaii, where the firm has six factories. It has also opened the first plant in New England for complete factory fabrication of paper milk container at Needham, Mass.

Bemis Bro. Bag Co. has completed and opened two new plants for production of paper bags and specialties at Crossett, Ark., and Albion, N. Y.

Dorr Co. of Stamford, Conn., and **Oliver United Filters Inc.,** Oakland, Calif., have announced a merger.

Food Machinery & Chemical Corp., San Jose, Calif. has set up a new unit at Baltimore to take over an insecticide chemical business, to be known as the Fairfield Chem. Div.

Hinde & Dauch Paper Co. of Canada has acquired more than 95% of the common stock of Corrugated Paper Box Co., Ltd., Toronto.

Lynch Corp. is purchasing additional land for the possible future expansion of its Toledo plant which manufactures precision packaging equipment.

Minneapolis - Honeywell Reg. Co. has announced the purchase of the assets of Highland Research Corp., Denver maker of precision scientific instruments.

National Can Corp.'s new executive vice-presidents are Andrew M. Toft and Allen C. Staley, Jr.

Nest-A-Bin Co., aluminum bulk shipping container firm in Denver, has been purchased by Willys Motors, Inc., wholly-owned subsidiary of Kaiser Motors Corp.

H. K. Porter Co., Inc., sold its Buffalo steel division to Rochester Iron & Metal Co. (N.Y.) for approximately 2.6 million.

Pfaudler Co., Rochester, N. Y., has acquired Schock, Gusmer & Co., 84-year-old Hoboken supplier of brew house equipment.

Procter & Gamble Co. has made arrangements for the purchase of the assets and properties of Victory Mills, Ltd. soybean refining firm of Toronto.

Rhodia, Inc. has appointed H. C. Nichols as head of its new Engineering Service Section of the Industrial Reodorants ("Alamask") Div.

Robertshaw-Fulton Controls Co. has broken ground for its new $2 million plant for the Bridgeport (Conn.) Thermostat Div.

Deaths

Louis W. Chapin, 68, president of Vanilla Labs., Inc.—Sept. 7.

Wilbur H. Coultas, Associate Director of Dept. of Live Stock of Amer. Meat Institute.—Sept. 12.

Jay Hormel, 62, chairman of board of George A. Hormel & Co.—August 30.

J. S. McLean, 78, founder and board chairman of Canada Packers, Ltd.—Sept. 1.

William J. Megginson, 70, manager of Armour & Co.'s Charleston branch.—Sept. 15.

Norris H. Sanborn, 53, food technologist in charge of N.C.A.'s waste disposal program.—Sept. 4.

W. W. Wylie, 60, manager of Borden's Hamilton (Ohio) Milk Co.—Aug. 16.

Just Off the Press

NEW CATALOGS AND BULLETINS: SEND FOR YOUR COPIES BY ENCIRCLING NUMBERS ON READER SERVICE CARD

FOOD PLANT EQUIPMENT

Steel Frames

Shaped, adjustable steel members with fittings. Foldout.—*Amer. Steel & Iron Works, 58th & S. Lowe Ave., Chicago 21.* (263A).

Steam Traps

Types of steam traps and air traps featuring inverted bucket principle, with tables and illustrations. File 30-C-23. 8 p.—*Armstrong Machine Works, 213 Maple St., Three Rivers, Mich.* (263B).

Solenoid Valves

Illustrated features of direct operated solenoid valves. Bulletin V-2. 10 p.—*Johnson Corp., Three Rivers, Mich.* (263C).

Rotary Joints

Three types of rotary pressure joints, with illustrations and pressure tables. Bulletins S-2000, J-3, N-2000. Each 4 p.—*Johnson Corp., Three Rivers, Mich.* (263D).

Water Heaters

Information on steam water heaters for instantaneous booster or storage heating of water and other liquids. Bulletin H. 12 p.—*Johnson Corp., Three Rivers, Mich.* (263E).

Valve Seat

Detailed description and illustrations of hydraulic and pneumatic control through pressure balanced, self-aligning, tubular valve seat, and its application in manual and solenoid valves. Catalog 4G. 34 p.—*Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58.* (263F).

Drive Units

Operating features, controls and modifications of variable speed drives. Catalog M-543. 24 p.—*Reeves Pulley Co., Columbus, Ind.* (263G).

Service Valves

Additions to line of general service solenoid valves. Bulletin A-3.—*J. D. Gould Co., 730 E. Washington St., Indianapolis, Ind.* (263H).

Cast Parts

Centrifugally cast parts suited for use as bushings, liners, sleeves, rings, etc., in ferrous or nonferrous metals. Bulletins 150 & 151.—*Shenango-Penn Mold Co., Dover, Ohio.* (263I).

Heat-Exchange Processor

Details on processor adaptable to various types of cooling and similar applications for powdered or granular solids, moist pastes or slurries. 8 p bulletin.—*Western Precipitation Corp., 1016 W. 9th St., Los Angeles 15.* (263J).

Steam Generator

Information on self-contained boiler unit. Bulletin. — *Ames Iron Works, Inc., Oswego, N. Y.* (263K).

Chain Drives

Illustrated, expanded data on capacity ratings, and operating principles of high speed, heavy-duty chain drives. Catalog C72-51. 16 p.—*Morse Chain Co., 7601 Central Ave., Detroit 8.* (263L).

Air Filtering Unit

Features of unit for dust or fume collection through cloth filtration, with application photos. Brochure RXM-11-51-PPC. 24 p. —Also folder LRXC-2-54-PPC. *Amer. Wheelabrator & Equipment Corp., Mishawaka, Ind.* (263M).

Carton Packers

Details on units for automatically packing and loading boxes and bags. Catalog 800-1. — *Standard-Knapp, Portland, Conn.* (263N).

Air Compressors

Line of commercial and industrial refrigerating machines in full range of sizes. Bulletin 100-F.—*Frick Co., Waynesboro, Penna.* (263O).

Speed Reducing Units

Line of reducers which can be mounted without modification on floor, wall or ceiling with shaft horizontal or vertical. Bulletin 186.—*Sterling Electric Motors, Inc., 5401 Telegraph Road, Los Angeles 22.* (263P).

Flow Meter

Description of meter for measuring and controlling flow of steam and gases, with selection and installation data. Bulletin 5011. 8 p.—*King Engineering Corp., Ann Arbor, Mich.* (263Q).

Unplasticized Valves

Needle and globe valves of unplasticized polyvinyl chloride. Leaflet.—*Industrial Plastic Fabricators, Inc., Norwood, Mass.* (263R).

Automatic Slicer

Features and specifications of automatic reciprocating bread slicer. Bulletin DM-1218. 4 p.—*American Machine & Foundry Co., 261 Madison Ave., New York City 16.* (263S).

Filter Presses

Reference manual on industrial filtration equipment and methods. Catalog.—*D. R. Sperry & Co., Dept. FOE, Batavia, Ill.* (263T).

Condenser Model

Specifications and selection table on Freon condenser. 4 p. leaflet.—*Doyle & Roth Mfg. Co., Inc., 136-50 Twenty-Fourth St., Brooklyn 32.* (263U).

Ice Breakers

Illustrated description of ice breakers, ice sizing, and auxiliary equipment. Bulletin 482. 20 p.—*Gifford-Wood Co., Hudson, N. Y.* (263V).

Industrial Incinerator

Information on 3 sizes, installation and operation of incinerators for industrial and commercial use. Form 3-30-54-25C. 6 p.—*Winnen Incinerator Co., 932 Broadway, Bedford, Ohio.* (263W).

Water Coolers

Operating principles and applications of rapid coolers for water or other liquids. Bulletin 153-I. 8 p.—*Frick Co., Waynesboro, Pa.* (263X).

Return Trap

Features and operation of electrically-motivated return trap which can be installed in close quarters. Bulletin ET-2. 8 p.—*Johnson Corp., Three Rivers, Mich.* (263Y).

Control Valves

Design details and operating characteristics of line of needle type valves for low flow rates. Bulletin 5C-13. 8 p.—*Foxboro Co., Foxboro, Mass.* (263Z).

Purifier Units

Catalytic exhausts for removing harmful exhaust fumes from internal combustion engines. 4 p. brochure. — *OXY-Catalyst, Inc., Wayne, Pa.* (263AA).

Heat Pumps

Features and advantages of heat pumps for year-round air conditioning. Bulletin FT-50-A. 4 p. —*Acme Industries, Inc., Jackson, Mich.* (263AB).

Air Separator

Unit teamed with cooler to deliver clean, dry compressed air. Bulletin S. 4 p.—*Johnson Corp., Three Rivers, Mich.* (263AC).

Tube Furnaces

Two models, seven sizes of high temperature electric tube furnaces, with ordering information. Bulletin 310. 4 p.—*Burrell Corp., 2223 Fifth Ave., Pittsburgh 19.* (263AD).

Bakery Equipment

Features and specifications of continuous feed roll equipment. Bulletin DM-1158. 6 p.—*Amer. Machine & Foundry Co., 261 Madison Ave., New York City 16.* (263AE).

Enclosed Motors

Line of completely enclosed, sanitary motors. Data booklet 3410. 6 p.—*Master Electric Co., Dayton 1, Ohio.* (263AF).

Standby Generator

Facts on packaged high-frequency generator sets for continuity of power supply. Bulletin 200-FF-22. 6 p.—*Electric Machinery Mfg. Co., Minneapolis 13.* (263AG).

Clad Motors

Silicone-coated motor with high corrosion or weather resistance. Bulletin 1300-PRD-217. 4 p.—*Electric Machinery Mfg. Co., Minneapolis 13.* (263AH).

Pressure Boilers

Description of packaged boilers in medium pressure range, with photos, specification tables. Form S. E. WT-7. 8 p.—*Wm. Bros. Boiler & Mfg. Co., 1057 Tenth Ave. S. E., Minneapolis 14.* (263AI).

Stoker Unit

Features of model of stoker used with boiler installation as single unit with illustrations. Form F16-11-53-5M. 6 p.—*Wm. Bros. Boiler & Mfg. Co., 1057 Tenth Ave., E. S., Minneapolis 14.* (263AJ).

Generating Equipment

Illustrated description of boilers, high furnaces, water walls, and air heaters. Form WT-4-JP 3-50 5M. 8 p.—*Wm. Bros. Boiler & Mfg. Co., 1057 Tenth Ave., S. E., Minneapolis 14.* (263AK).

Compressor Models

Construction details on 4, 6, or 8 cylinder compressor models. Bulletin 912. 4 p.—*Vilter Mfg. Co., Milwaukee 7.* (263AL).

Milk Evaporators

Information on evaporators, preheaters, condensers and pans for milk production. Bulletin 10M-10-48-JPC. 8 p.—*Henszey Co., Watertown, Wis.* (263AM).

Transmission Products

Descriptions and illustrations of silent chain, roller chain and drives, sprockets, cable chains, drive shafts, couplings and clutches. Bulletin B 20-53. 8 p. —*Morse Chain Co., 7601 Central Ave., Detroit 10.* (263AN).

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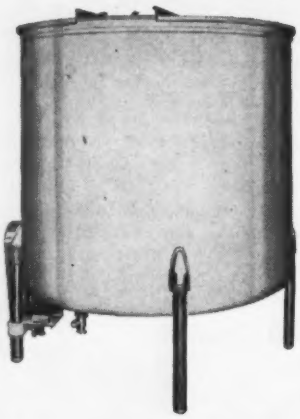

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Features of line of high pressure blowers, with charts and specifications. Bulletin CTB-103. *Chicago Blower Corp., 9867 Pacific Ave., Franklin Park, Ill. (264A).*

Heat Exchanger

Application and construction data on heavy duty plate heat exchanger. Bulletin E-1153.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264B).*

Carton Fillers

Description of line of paper carton milk fillers designed for operation in small and medium sized dairy plant. Bulletin 15M. 4 p.—*Triangle Package Machy. Co., 6633-55 W. Diversey Blvd., Chicago 35. (264C).*

Dairy Equipment Line

Line of miscellaneous equipment for dairy use. Form 1917. 14 p.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264D).*

Fruit Feeder

Description and application photos of heavy duty fruit feeder for continuous ice cream freezers. Bulletin M-6. 4 p.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264E).*

Bottle Filler

Features of stainless steel vacuum bottle filler. Form 1913. 4 p.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264F).*

Beer Coolers

Models of stainless steel wort and beer coolers for heating, cooling, regenerating. Bulletin 509. 6 p.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264G).*

Fillers & Cappers

Features of gravity or vacuum filling or capping machines, with optional equipment. Bulletin F-914. 4 p.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264H).*

Valve Control

Illustrated description of mechanism for limiting amount of torque applied to valves. 4 p. brochure. — *Philadelphia Gear Works, Inc., Erie Ave. & G. St., Philadelphia 34. (264I).*

Solids Feeder

Information on unit for feeding fluidized beds of solids in dense phase. Form FF-1. 8 p.—*Sawyer Bailey Corp., 1559 Niagara St., Buffalo, N. Y. (264J).*

Fabricated Metals

Properties and uses of corrosion resistant alloys for process industries. Bulletin PI-3b. 20 p.—*Ampco Metal, Inc., Milwaukee 46. (264K).*

Centrifugal Pump

Design features and advantages of all-bronze centrifugal pump. Buulletin P-3a. 4 p.—*Ampco Metal, Inc., Milwaukee 46. (264L).*

Power-Transmission Units

Line of drives, sheaves, and pulleys. 4 p. brochure.—*Amer. Pulley Co., Philadelphia 29. (264M).*

Dairy Equipment

Models of filters, coolers, and strainers for milk products industry. 6 p. compiled brochure.—*W. M. Sprinkman Corp., 4022 North Port Washington Ave., Milwaukee 12. (264N).*

Vs. Water Hammer

Information on sealed air chamber designed to stop water hammer in pipe lines. 24 p. booklet.—*Wade Mfg. Co., Elgin, Ill. (264O).*

Steam Trap

Operating characteristics and features of bucket-type steam trap. Bulletin 800. 12 p.—*Perfecting Service Co., 332 Atando Ave., Charlotte 6, N. C. (264P).*

Small Boilers

Line of boilers in 50-80 hp. for heating and processing. Bulletin AD-135. 4 p.—*Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12. (264Q).*

Homogenizer Models

Construction details of single-valve, various sized homogenizers, with photos, diagrams and dimension tables. Bulletin N-12. 8 p.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7. (264R).*

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Air Conditioners

Various types of air coolers, with engineering data, dimensional tables and illustrations. Bulletin 810. 8 p.—*Vilter Mfg. Co., Milwaukee 7, Wis. (264T).*

Hydraulic Equipment

Description and illustrations of pumps, pump motors, pumping units and various controls. Bulletin 146-B. 4 p.—*Denison Engineering Co., 1160 Dublin Rd., Columbus 16, Ohio. (264U).*

Speed Reducers

Features and illustrations of worm gear speed reducers. Bulletin HW654.—*Winsmith, Inc., Springfield, N. Y. (264V).*

MATERIALS HANDLING

Delivery Bodies

Features of line of beer delivery bodies. 4 p. bulletin.—*Herman Body Co., 4400 Clayton Ave., St. Louis 10. (265A).*

Crane Arm

Specification data on crane arm attachment for fork lift trucks. 2 p. folder.—*Buda Co., Harvey, Ill. (265B).*

Portable Elevators

Description and illustrations of line of portable hand-operated and electric elevators. Bulletin 548-R. 16 p.—*West Bend Equipment Corp., West Bend, Wis. (265C).*

Drum Handling Equipment

Types of electro hydraulic, drum-tilting mobile elevators, drum and barrel trucks and stands. Bulletin 853.—*West Bend Equipment Corp., West Bend, Wis. (265D).*

Lift Tables

Models of portable and hydraulic lift tables. Bulletin 354. —*West Bend Equipment Corp., —West Bend, Wis. (265E).*

Floor Trucks

Illustrated features of line of two-wheel and four-wheel trucks with accessories. 20 p. catalog.—*West Bend Equipment Corp., West Bend, Wis. (265F).*

Freight Elevators

Construction features and illustrations of self-contained electric freight elevators. 8 p. brochure. —*West Bend Equipment Corp., West Bend, Wis. (265G).*

Adjustable Ramp

Description and illustrations of 40,000 lb. capacity hydraulic adjustable ramp. Catalog Sheet.—*Rowe Methods, Inc., 2534 Detroit Ave., Cleveland 13. (265H).*

Wheel-Rollers

Line of wheel-rollers, belts, loaders, etc., with diagrams and application photos. 16 p. catalog.—*Rapids-Standard Co., Inc., Grand Rapids 2, Mich. (265I).*

Trolley Conveyor

Illustrated features of trolley conveyor with bucket hangers. Bulletin 254-3M. 4 p.—*Hapman Conveyors, Inc., Kalamazoo, Mich. (265J).*

Refrigerated Truck

Information on hydraulically operated refrigeration system that runs off truck engine and requires no major chassis revision, with insulated truck body. 6 p. folder.—*Herman Body Co., 4400 Clayton Ave., St. Louis 10. (265K).*

Industrial Trucks

Electric trucks in capacities ranging from 1- to 100,000 lb., with cut-away photos and diagrams. 12 p. booklet.—*Yale & Towne Mfg. Co., Philadelphia 15. (265L).*

Truck Battery

Operation features of nickel-iron-alkaline storage battery for industrial trucks. 20 p. booklet. —*Edison Storage Battery Div., Thomas A. Edison, Inc., W. Orange, N. J. (265M).*

Belt Conveyors

Details on steel belt conveyors. 4 p. bulletin.—*West Bend Equipment Corp., West Bend, Wis. (265N).*

Lift Trucks

Line of hydraulic lift trucks and custom-built, skid platforms with specification tables. Bulletin LT453. 12 p.—*West Bend Equipment Corp., West Bend, Wis. (265O).*

Refrigerator Body

Description and photos of refrigerator motor truck body. Bulletin 144. 4 p.—*Meyer Body Co., Inc., Buffalo, N. Y. (265P).*

Tractor Models

Features of four-wheel and twin-three wheel models, with detailed specifications, and illustrations. Bulletins T-201, T-202, T-203, T-204. — *Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9. (265Q).*

Body Frames

Construction features of welded steel framed and bodies. 4 p. bulletin. — *DeKalb Commercial Body Corp., DeKalb, Ill. (265R).*

Conveyor Equipment

Features of types of conveyors, including gravity wheel and roller, power helpers, live roller, switches, curves and accessories. 6 p. folder. — *Metzgar Co., Grand Rapids 4, Mich. (265S).*

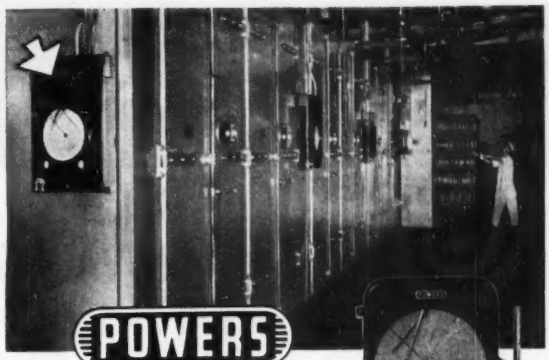
CONTROL EQUIPMENT

Test Chamber

Specifications and operating instructions on temperature test chamber model. 4 p. bulletin—*Stratham Development Corp., 12411 W. Olympic Blvd., Los Angeles 64. (265T).*

pH Instrumentation

Drawings, photos, and description of instrumentation for pH measurement and automatic control, with accessories. Bulletin Q1304. 38 p.—*Bristol Co., Waterbury 20, Conn. (265U).*



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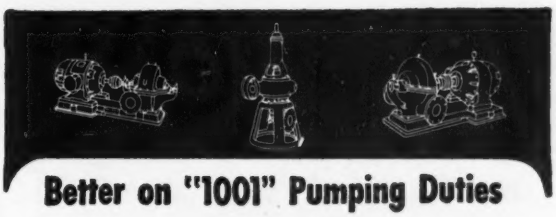

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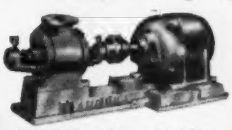

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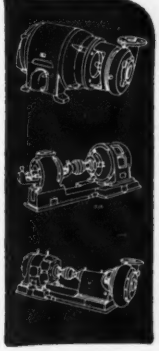

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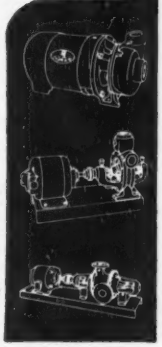

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Frequency Recorder

Instrument for continuous measurement of frequency in generator performance. Data Sheet 9.18a.—*Minneapolis-Honeywell Reg. Co., Philadelphia 44. (266A).*

Weight Transmitters

Description and illustrations of pneumatic weight transmitter combined with receiver and controllers to form complete weighing systems. Data Sheet D.18-6. 4 p.—*Minneapolis-Honeywell Reg. Co., Philadelphia 44. (266B).*

Electro-Analysis Apparatus

Features of single position electro-analyzer for laboratory use. Bulletin 370.—*Eberbach Corp., Ann Arbor, Mich. (266C).*

Temperature Regulators

Comprehensive engineering data on thermostatic temperature regulators, with cutaway photos and diagrams. Bulletin S-6. 12 p.—*Lawler Automatic Controls, Inc., 453 N. Macquesten Parkway, Mt. Vernon, N. Y. (266D).*

Infra-red Analyzer

Features of continuous recording infra-red analyzer for liquids or gases. Data Sheet 10.16-7b. 4 p.—*Minneapolis-Honeywell Reg. Co., Philadelphia 44. (266E).*

Colorimeter Model

Information on instrument for making routine colorimetric analyses. 6 p. brochure.—*Schaar & Co., 754 W. Lexington St., Chicago 7. (266F).*

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2401 Third Ave., N. Y. 51, N. Y.
Tel: CYpress 2-5703 - Cable: Briston, N. Y.

MEC SPECIAL OFFERS

1—Swenson Vacuum Cooling Crystallizer Double Effect—Cap. 1670# Hr.
1—Feinc 6' Dia. S. S. Filter 24 Sq. Ft.
1—Feinc 3' x 1" S. S. Rotary Vac. Filter.
1—Direct Heat 4' x 30' S. S. Lined Rotary Dryer.
1—Buflovak 6' Dia. Vac. Crystallizer.
1—Double Drum Dryer 48" x 108".
8—Devine #27 & 28 Vac. Shelf Dryers, 17 & 20 Shelves 59" x 78".
1—Buflovak 20 Shelf Vac. Dryer 42" x 42".
3—Stokes 6 Shelf Vac Dryers 24" x 24".
6—Ribbon Mixers 400 to 4000# Cap.
1—Sweetland #12 Filter—72 Brze. Leaves.
1—Pfaudler 100 Gal. G. L. Reactor.
5—Pfaudler 100 Gal. New Vac. G. L. Receivers.
2—Lee 300 Gal. S. S. Tanks—Jack & Ag.
1—Sperry 24" C. I. Filter Press 40 Ch. 2" Cake, Hyd. Closure.
1—Mikro 2TH Pulv. 15 H. P. Motor.
3—N. J. Label-Dri Machines.
1—Stokes B-2 Rotary Tab. Machine.

New Stainless Steel & Steel Spiral Mixers; Kettles & Jack. Tanks.

Send for our latest bulletins.

THE MACHINERY & EQUIPMENT CORP.

533 West Broadway, New York 12, N. Y.
GRamercy 5-6680

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6 NASH HYTOR AIR COMPRESSORS

Need oilfree air? We have 6 Nash compressors, ranging in capacity 225 cfm. at 60 psi., with brand new Westinghouse 60 HP motor. 2—Nash Hytor units with 7½ HP motors; all first class condition, details upon request.

FS 4038 Food Engineering
330 W. 42 St. New York 36, N. Y.

Chas. S. JACOBOWITZ Corp.
3083 MAIN ST. - BUFFALO 14, N. Y. - AMHERST 2100

TANKS CLOSEOUT SALE

We have decided to sell these tanks cheap—but really cheap! All are absolutely first-class condition. Space does not permit detailed description. Firm prices can be quoted when we know how many tanks you can use, whether to be loaded on cars or trucks—etc. We have sold more tanks than all other dealers in the United States combined—and there must be a reason why. Let us prove it to you.

***BOSTON—36 TANKS—**
as low as 3¢ per gallon!
17—6510 gal. ea., 10' O.D. x 12' high
6—8215 gal. ea., 10' O.D. x 15' high
7—6510 gal. ea., 10' O.D. x 12' long

***BUFFALO—14 TANKS—**
less than 50% of new!
10—7316 gal. ea., 10' x 13'6" long
2—6076 gal. ea., 8'6" x 15'6" long
2—6448 gal. ea., 10'6" x 11'2" high

***ROCHESTER—24 TANKS—**
we'll accept as little as 6¢ per gallon!
10—6820 gal. ea., 8'10" x 16'4" long
4—7037 gal. ea., 8'10" x 16'8" long
6—6665 gal. ea., 8'10" x 16'4" long
4—6448 gal. ea., 8'10" x 15'4" long

***PEORIA—16 TANKS—**
already removed from brewery!
16—6789 gal. ea., 8'3" x 10' high

***FLINT—34 TANKS—**
lastiglass lined—a real bargain!
16—12,555 gal. ea., 10' O.D. x 23'6" high
6—3,875 gal. ea., 9' O.D. x 9'6" long
12—4,030 gal. ea., 9'6" x 8'6" long

***SHERIDAN—41 TANKS—**
to be sold for about 25% of new prices!
23—2,325 gal. ea., 7'6" x 7' high
10—5,642 gal. ea., 9'6" x 12' high
8—4,557 gal. ea., 8'6" x 12' high

All offers subject to prior sale—Options for inspection upon request.

FILTERS

The following equipment available immediate delivery:
Shriver plate and frame, aluminum, 36" plates.
Enzinger diatomaceous earth 250 sq. ft., stainless.
Sparkler 12.3 sq. ft. Everdur. Enzinger 38# Monel S/J
Sparkler 40.6 sq. ft., stainless.
Niagara 160 sq. ft., stainless leaves
Enzinger Schalen filters, bronze plates.

Serving American Industry for over 40 Years

WE HAVE IN STOCK FOR IMMEDIATE DELIVERY THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company
1347 So. Ashland Ave., Chicago, 8, Illinois
PHONE: CHesapeake 3-5300

FOR SALE

New Jersey Meter Company can drier for 12-oz. flat tops, U. S. Bottlers' Rinser for 12-oz. bottles; both like new, immediate delivery.

and

New Jersey "Pony Labelrite" semi-automatic Model 86M, with 3 HP motor; will handle labels up to 3-½ by 3-½; bargain price.

FS-4032, Food Engineering
330 W. 42 St., New York 36, N. Y.

8-STATION AUTOMATIC FILLER

Manufactured by Philadelphia Filler Machine Co. New 1952. Used less than 2 weeks. All stainless contact parts—self driver. Cost new $7,000.00.

BURNHAM & MORRILL COMPANY
P. O. Box 1871 Portland 2, Maine

FOR SALE

MAYONNAISE AND SALAD DRESSING MACHINE

Stainless 30 gal. Case Emulsifier & Homogenizer. Complete with mixing tank and tanks for oil, water and vinegar.

Will make and pump to filler 30 gals. every 3 to 4 minutes.

New condition $1,250.00 formulas also go with machine.

McARTHUR FOODS
8029 Jensen Houston, Texas

LATE-TYPE PROCESS EQUIPMENT
Reduced For Quick Sale

UNION Rebuilt Machinery Established 1912

FILLERS & CAPPERS

Elgin 24-Head Rotary Vacuum Filler.
Capem 1 SF 4-Head Auto. Capper.
Stokes & Smith G1, G2 and HG88 Duplex Auger Fillers.
Whiz Packer and Triangle Vol. Fillers.
Triangle Package Models A3, G2C, G2S, A6CA, Elec-Tri-Pak Fillers.
Horix 14-Head Rotary Filler.
Pfaudler King C9 Stainless Steel Rotary Gravity Filler.
Filler 4, Hope 6 S.S. Piston Fillers.

MIXERS

Day, Robinson Dry Powder Mixers and Sifters, 200, 600, 1500, 10,000 lbs.
850 gal. Steel Vertical S. J. Mixer, M.D.
Day 650 gal. Jacketed Jumbo Mixer.
Day, New Era, Hottman Mixers 2 to 3500 gals. with/without Jackets, Single and Double Arm Agitators.
Mikro 2SH, 1SH, Bantam Pulverizers; Schutz O'Neill Mills.
Tyler Hummer #27 2-Deck Sifter.

WRAPPERS

Stokes & Smith A and B Transwraps.
Doughboy, Amsco Rotary Bag Sealers.
American Can 0-8 Rotary Can Closer.
Standard-Knapp No. 429 Carton Sealer.
Haysson; Package Machy. Co. FA, FA4, DF, CA2; Miller, Scandia and Oliver Automatic Cellophane Wrappers.
Pneumatic Automatic Cartoning Unit, 60 and 30 per min.
Hudson Sharp Campbell Auto. Cellophane Wrapper.
Standard Knapp No. 429 Carton Sealer.

LABELERS

Kyler A, Burt Adj. Wraparound Labelers.
Pony Model MX Labelrites.

MISCELLANEOUS

Fitzpatrick "D" Stainless Steel Comminuter, with and without Auto. Screw Feeds, Jacket Chamber.
F. J. Stokes Rotary Tablet Machine.
Colton 2, 3RP, 4 Tablet Machines.
Sperry 12" S. S. P. and F Filter Press.

Additional Information and Quotations Available On Request
Write Today or Wire Collect

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

FOR SALE

100 gal. S.S. Tank 30"x36", side agit.
Double Effect S.S. Evaporator.
Buflovak S.S. Spray Dryer, 500 lb. per hr.
APV Heater, 8 pair S.S. Plates, 200 g.p.h.
75 gal. Monel Jktd. Kettle, 35"x27", agit.
100 to 300 gal. S.S. Mix Tanks, water jkt.
300 gal. S.S. Tank, 3'x7', agit.
32"x52" & 36"x84" Double Drum Dryers.
26" Centrifugal Extractors, 3 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
3000 gal. S.S. Truck Tanks, Trailerized.
A.B.C. Carton Compression Unit.
5-Unit Room Coolers, Freon or Ammonia.
3 Ton Clark Fork Lift Truck, solid tires.
3 H.P. Freon Compressor Unit.
35 H.P. International Boiler, Oil Fired.
Milk Pasteurizers, Coolers, Fillers, Washers.
Send us your inquires

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

MEYER CATARACT PASTEURIZERS

Elsewhere in this publication, you will find an advertisement of the Geo. J. Meyer Mfg. Co. We have available, four of their "Cataract", automatic pasteurizers, or coolers, used a few years only, available for immediate delivery, priced as low as 25¢ on the dollar.

1—only, Meyer Model 930 machine, capacity 100—12-oz. bottles per minute
1—only, Meyer Model 1035 machine, capacity 132—12-oz. bottles per minute
1—only, Meyer Model 1245 machine, capacity 210—12-oz. bottles per minute
1—only, Meyer Model 1345 machine, capacity 225—12-oz. bottles per minute

Complete details upon request. Offers subject to prior sale.

FS-4031, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOR SALE

38" Copper Coating Pans with steam coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. M-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ H.P. 3 phase motor
Burns Split Nut Peanut Blancher

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

IN STOCK
IMMEDIATE SHIPMENT

Agitators, electric: ¼ to 5 hp.
Cappers: Resina and Titecap automatic. New Swanson semi-automatic.
Clarifiers: DeLaval 84-51 and 600.
Condensers: St. steel Tubular, 16 sq. ft.
Cutter: Ball & Jewell rotary, 20 hp.
Dryer: Devine 2x4' vac. drum, 316 s.s.
Fillers: various for liquids, paste, powder.
Filters: Alsop, Sparkler—internal pressure. Sperry, Shriver—plate and frame.
Homogenizers: Manton-Gaulin 60 GPH. Union Steam Pump 150 GPH.
Kettles: 5 gal. to 100 gal. stain. steel, jack. 3—100 gal. jacketed and agitated. 1—New 50 gal. tilting agitated.
Labelers: New Jersey, World for bottles. Burt Knapp for wrap around.
Mills: Attrition, 36" Sprout-Waldron, 50 hp. Colloid: Premier, Charlotte—1 to 7½ hp. Hammer: Prater, Williams—5 to 60 hp. Roller: Day 16x40 and 12x32".
Mixers: Dough—single arm, double arm to 100 gal. Powder, horizontal ribbon: 100 to 2000 lb.
Pumps: Centrifugal, rotary, vacuum. Large stock.
Screens: Rotex 40 x 84", single and double deck.
Tanks: Stain. steel, open, closed—to 1200 gal.

LOEB EQUIPMENT SUPPLY CO.
(OUR 31ST YEAR)
820 WEST SUPERIOR ST. CHICAGO 22, ILL.
Tel: Seeley 8-1431

MODERN PACKAGING EQUIPMENT
FOR IMMEDIATE DELIVERY

PNEUMATIC HIGH SPEED Cartoning Line, consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.
PNEUMATIC SCALE CO. Large and Small Liners.
PNEUMATIC SCALE CO. Tightwrap, High Speed.
PNEUMATIC SCALE CO.—WORLD and PONY fully automatic and semi-automatic labelers, 60-120 per minute.
PNEUMATIC SCALE CO., CONSOLIDATED AND RESINA fully automatic Cappers, 1, 3 and 4 Head.
STANDARD-KNAPP Model 429 Case Sealer and Compression Unit.
STANDARD-KNAPP Case Loader and Unloader.
STOKES & SMITH model HG84, Twin Auger Filler with Vacuum Attachment, Also Models G and GD.

Partial List—send for complete list of equipment in stock

WANTED

PNEUMATIC SCALE CO. automatic feeders and bottom sealers. Medium or high speed. Will also purchase complete lines.
PACKAGE MACHINERY CO. Model FA or FAQ cellophane wrappers.

ALLIED EQUIPMENT CO.
940-948 Nepperhan Ave. Yonkers 3, N. Y.
Phone: Yonkers 5-0442

Looking for GLYCERINE?

Shell Chemical is a convenient, dependable source for glycerine, *offering the highest purity product available.* Expanded facilities make Shell Chemical one of the nation's leading suppliers of glycerine... in any quantity from a drum to a tank car.

Your Shell Chemical representative will gladly give you the specifications of this high-quality glycerine.

SHELL CHEMICAL CORPORATION

CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE

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WIN IN THE BATTLE OF BRANDS

Gaylord Boxes

There are more than 150,000 brand names registered in the United States—competing for the customer's attention.

In this "battle of brands" brightly printed Gaylord Boxes are a vital link in the chain of visual impressions that pays off in sales.

This is true because Gaylord excels in printing. Gaylord has the specialized experience and equipment to make quality boxes do their selling best—with your brand name accurately expressed in eye-catching colors.

Put Gaylord Boxes on your selling team. Call your nearby Gaylord office.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

SALES OFFICES FROM COAST TO COAST ★ CONSULT YOUR LOCAL PHONE BOOK

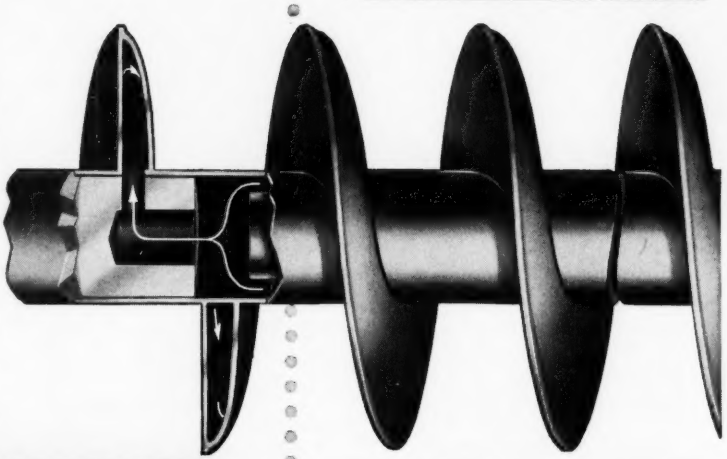
A revolutionary new principle in Coolers . . .

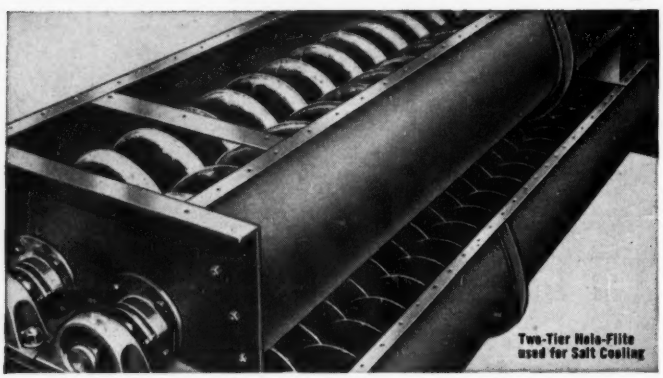
THE holo-flite* PROCESSOR

(HOLLOW-FLITE)

- Handles Pastes, Sludges or Solids!
- Up to 80% Saving in Space!
- Permits Continuous, High Efficiency Operation!

Backed by the same well-known organization that pioneered COTTRELL Precipitators, MULTICLONE Collectors and other leading products, the HOLO-FLITE Processor represents a far-reaching advancement in the science of heat-exchanger design. Widely adaptable to various types of cooling and similar applications in industrial processing operations, the HOLO-FLITE handles powdered or granular solids, moist pastes or slurries with equal facility. Moreover, it requires as little as 1/5th the space of other heat exchangers . . . causes no dust, therefore requires no costly or complicated auxiliary recovery equipment . . . and maintains its uniformly high efficiency under modern continuous-flow operations (no stop-and-go "batching" operations are necessary).





Two-Tier Holo-Flite used for Salt Cooling

Unique Simplicity

Basically, the HOLO-FLITE consists of two or more hollow intermeshing conveyor screws that slowly rotate in a trough or tube. The cooling agent circulates through the hollow flights and shafts of the conveyor screws while the product itself "flows" in the trough where it is constantly rotated into, around, over and under the moving heat-exchange surfaces. The continuous mixing, turning, folding action causes a constant change of contact with the heat-exchange surfaces and results in a high rate of heat transfer. Yet the action is so gentle that there is no dusting and little, if any, abrasion of crystalline particles.

Unlimited Capacity

HOLO-FLITE Processors can be readily adapted to virtually any capacity requirement and are in daily operation on such varied products as sand, cement, cottonseed cake, soybean meal, borax, salt, sugar, baby foods, and many other products. Cooled products can be packaged directly from the HOLO-FLITE discharge, saving time, space and additional handling.

Be sure to investigate HOLO-FLITE savings before you install heat-exchange equipment. To insure maximum operating efficiency at low overall cost, each installation is individually engineered to the job using basic stock-size elements. Contact the nearest Western Precipitation office for further details on the revolutionary HOLO-FLITE Processor—or write direct!

FREE! New 8 Page Bulletin describing HOLO-FLITE features and applications will gladly be sent on request!

*Reg. T.M.

A FEW OF MANY HOLO-FLITE ADVANTAGES

WIDE ADAPTABILITY: HOLO-FLITE handles fine-grained, crystalline or powdered solids, pulps, pastes and slurries with equal ease. Heat transfer agent can be refrigerant, cooled or ambient water, or other fluids to provide a wide range of processing temperatures.

SPACE-SAVING COMPACTNESS: Because of its large active heat-transfer surface per cubic foot of space required, the HOLO-FLITE requires only a minimum of space—is 5 to 6 times as compact as other equipment of comparable capacity!

LOW POWER REQUIREMENTS: HOLO-FLITE conveyor screws rotate slowly—usually only 1 to 12 r.p.m. Further, multiple tiers can be driven by one motor, assuring low power consumption.

INSTALLATION FLEXIBILITY: The basic HOLO-FLITE unit is two intermeshing screws in a single trough, but four or six screws per trough can also be installed. Moreover, any number of troughs can be "tiered" on top of one another—trough lengths can be varied from 8 to 20 ft.—screw diameters can be varied from 7" to 16"—to provide virtually any desired capacity in a minimum of space!

Write for full details on the many savings the HOLO-FLITE Processor can bring to your particular applications.

WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1016 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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